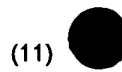


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(54) PROTECTIVE CLOTHING FOR REGIONS OF LOWER LIMB

(57) The present invention provides a leg protection garment that is effective for mainly supporting the hamstrings, the muscle of the posterior side of the femoral region among the leg portion. The leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, the garment having a portion having a partially strong straining force, the portion having a strong straining force comprising at least a portion having a strong straining force 101 (A) which ranges from an area above the trochanter major to the vicinity 5 of the upper end of the tibia by way of the trochanter major and further the vicinity over the boundary between the musculus biceps femoris and the tractus iliotibialis so as to support the musculus biceps femoris, wherein the portion obliquely crosses the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris.

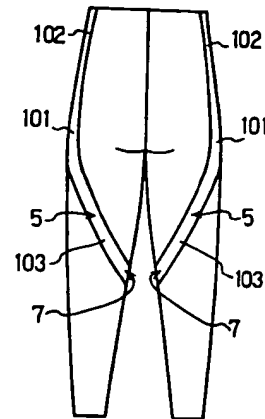


FIG. 36

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Description

TECHNICAL FIELD

[0001] The present invention relates to a lower leg protection garment.

[0002] More particularly, it relates to a leg protection garment applied generally in close contact with the surface of the human body and is mainly effective for supporting the hamstrings, namely, the muscles of the posterior side of the femoral region of the leg.

BACKGROUND ART

[0003] Hitherto, various kinds of sports or training activities or the like excessively load muscles of the leg region to often cause disorders in this region. In order to prevent such disorders in muscles or to support the relevant muscles or bones when disorders occur, a taping treatment or so-called supporter has been employed. However, the above mentioned conventional taping method has a problem, for example, the taping treatment requires skill etc. Moreover, the taping treatment inhibits the movement of muscles in order not to contract excessively. On the other hand, the supporter, worn over the articulation, also restricts the movement of the articulation, and in turn often indirectly inhibits the movement of muscles. Therefore, both the taping treatment and supporter restrict the function of muscles and do not have the function of supporting the contraction of muscles.

[0004] Thus, a leg protection garment having a structure for supporting the specific muscles of the leg by a portion having a strong straining force has been developed (See Publication of Japanese Patent Application No. Tokkai Hei. 4-343868, No. Tokko Hei 6-41641, No. Tokko Hei 6-51921). These leg protection garments: can easily be put on adequately by ordinary people; provide a comfortable wearing condition without making a user feel pain in use; have no hygienic problems such as an occurrence of itch in the skin due to becoming stuffy; and furthermore support the muscle contraction and help the extended muscle easily recover, so that they are effective for reducing the muscle fatigue in exercise and they exhibit the effect of promoting the prevention or treatment of specific disorders etc. of the leg.

[0005] Moreover, the leg protection garment described in the above mentioned official gazettes support the muscles of the medial, lateral and anterior sides of the femoral region, or the muscle below the patella region. Among such muscles, the musculus quadriceps femoris, for example, has a function of flexing the articulatio coxae and extending the articulatio genus. However, the articulatio genus becomes unstable when it is in the extension position, so that some impact easily cause a rupture of the ligament and a fracture in the vicinity of the articulation. Therefore, by supporting the muscles quadriceps femoris, the function of the musculus quadriceps femoris can be strengthened and the above mentioned disorders can be prevented.

[0006] However, as mentioned above, the conventional leg protection garment supports only the medial, lateral and anterior sides of the femoral region, but does not support the hamstrings, i.e. the muscles of the posterior side of the femoral region. Herein, the hamstrings means the muscles of the posterior side of the femoral region, namely, the combination of the musculus biceps femoris, the musculus semitendinosus, and the musculus semimembranosus. These muscles are mainly used, for example, : ① when strongly stepping backward on the ground in running, particularly, in increasing the running speed; ② when jumping higher in jumping; and ③ when stepping up bicycle pedal after stepping it downward. These muscles have functions of extending the articulatio coxae and flexing or adducting the articulatio genus. The hamstrings having such functions also play important roles in various sports, for example, rugby, soccer, basketball, volley ball, baseball, golf, bicycle race, bobsleigh, etc. For example, in the movement of running quickly after scrum and break in rugby, if the posterior side of the femur is not used well, it is necessary to switch the stressed place from the anterior side to posterior side, and so a smooth movement cannot be conducted. Also, the same is true in the play after taking rebound in playing basketball. In other words, the musculus extensor of articulatio coxae plays an important role in providing a stability of the pelvis in the front and back directions, and is particularly involved in the extension of the extensor muscle of articulatio coxae at the time of normal walking. In sports in which players kick the ground (running, basketball, volley ball, etc.), if the pelvis position moves upward and downward, power disperses and the following motion cannot be smoothly conducted. Moreover, in some aspects of jumping in playing volley ball, if players can jump without bending knee deeply, it is advantageous that they can jump by taking the speed of support running. In such a case, it is necessary to jump by mainly using the posterior side of the femur. Furthermore, in bobsleigh, the first pushing start is a key to the following speed. The muscles used for this first pushing start are hamstrings. Thus, hamstrings have important functions in various kinds of sports. However, it is generally indicated that, in Japanese people, the hamstrings is weaker than the muscles of the anterior side of the femoral region such as the musculus quadriceps femoris, etc.

DISCLOSURE OF THE INVENTION

[0007] It is the object of the present invention to provide a garment which has a structure in which a tape-like portion having a stronger straining force than stretchable fabric is partially placed on a garment main part having at least lower half of the body and being formed of stretchable fabric and to thus mainly support the muscle movement of the hamstrings, i.e. the muscles of the posterior side of the femoral region among the leg, which are not supported by the conventional leg protection garment.

[0008] Moreover, the leg position in which the articulatio genus is flexing is unstable and easily causes

disorders in the ligament of knee or the meniscus. Such disorders tend to occur in sports activities, for example, rugby or soccer, requiring a strong force generated by flexing the knee. Therefore, it is also the object of the present invention to prevent such disorders by supporting the hamstrings as mentioned above.

[0009] Furthermore, the function of the articulation of the knee can well be balanced when each muscle of the anterior side and posterior side of the femoral region sufficiently works well. Balancing like this cannot sufficiently be attained by the conventional leg protection garments described in Japanese Patent Application No. Tokkai Hei 4-343868, No. Tokko Hei 6-41641, and No. Tokko Hei 6-51921, since they only aim at supporting the muscles of the anterior side of the femoral region. Therefore, it is also the object of the present invention is to aid the function of the articulation of the knee and entire region of the articulation of the hip, by supporting not only the muscle of the anterior side of the femoral region but also the muscle of the posterior side of the femoral region by combining the garment of the present invention with the conventional leg protection garment.

[0010] In order to dissolve the above mentioned problems, the present invention provides:

(1) a leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, wherein the garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A) and/or (B) as the portion having a strong straining force;

(A) a portion having a strong straining force which ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity over the musculus biceps femoris and/or the tractus iliotibialis so as to support the musculus biceps femoris, wherein the portion passes the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris at right angle with respect to the direction of the muscle fiber;

(B) a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula by way of the vicinity over the musculus semimembranosus and/or the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion passes the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus at right angle with respect to the direction of the muscle fiber.

Moreover, it is preferable in the above mentioned leg protection garment that the portion (A) is a portion having a strong straining force which ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity 3 over the boundary between the musculus biceps femoris and the tractus iliotibialis so as to support the musculus biceps femoris, wherein the portion obliquely crosses the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris. And it is preferable that the portion (B) is a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula, by way of the vicinity 12 over the boundary between the musculus semimembranosus and the musculus adductor magnus 12 so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion obliquely crosses the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus.

Moreover, in the above mentioned leg protection garment, the following embodiments (I), (II) and (III) are mentioned as preferable embodiments: (I) an embodiment in which the portion (A) further has a portion having a strong straining force which, in an area above the trochanter major, passes over at least one muscle selected from the group consisting of the musculus tensor fasciae latae, the tractus iliotibialis, and the musculus gluteus medius (preferably the portion 6 over the musculus tensor fasciae latae); (II) an embodiment in which the portion (A) further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus; and (III) an embodiment in which the portion (B) further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus.

Furthermore, the leg protection garment of the present invention is:

(2) a leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, wherein the garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A) and (B') as the portion having a strong straining force;

(A) a portion having a strong straining force which ranges from an area above the trochanter major 1 to the

vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity over the musculus biceps femoris and/or the tractus iliotibialis so as to support the musculus biceps femoris from the side, wherein the portion passes the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris at right angle with respect to the direction of the muscle fiber;

(B') a portion having a strong straining force which ranges from the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus to the vicinity 14 of the upper end of the fibula.

Moreover, it is preferable in the above mentioned leg protection garment that the portion (A) has a portion having a strong straining force ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity 3 over the boundary between the musculus biceps femoris and the tractus iliotibialis so as to support the musculus biceps femoris, wherein the portion obliquely crosses the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris.

Moreover, in the above mentioned leg protection garment, the following embodiments (I), (II), and (III) can also be mentioned as preferable embodiments:

(I) an embodiment in which the portion (A) further has a portion having a strong straining force which, in an area above the trochanter majors, passes over at least one muscle selected from the group consisting of the musculus tensor fasciae latae, the tractus iliotibialis, and the musculus gluteus medius (preferably the portion 6 over musculus tensor fasciae latae);

(II) an embodiment in which the portion (A) further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus; and

(III) an embodiment in which the portion (B') further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus.

Furthermore, a leg protection garment of the present invention is:

(3) a leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, wherein the garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A') and (B) as the portion having a strong straining force;

(A') a portion having a strong straining force which ranges from the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris to the vicinity 5 of the upper end of the tibia;

(B) a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 over the upper end of the fibula by way of the vicinity over the musculus semimembranosus and/or the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion passes the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus at right angle with respect to the direction of the muscle fiber.

Moreover, it is preferable in the above mentioned leg protection garment that the portion (B) is a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 over the upper end of the fibula by way of the vicinity 12 over the boundary between the musculus semimembranosus and the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion obliquely crosses the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus.

Moreover, in the above mentioned leg protection garment, the following embodiments (I) and (II) are mentioned as preferable embodiments:

(I) an embodiment in which the portion (A') further has a portion having a strong straining force which

ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus;

(II) an embodiment in which the portion (B) further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus.

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(4) It is also preferable that the leg protection garment of the present invention further has a portion having a strong straining force (C) comprising a portion having a strong straining force which ranges from the upper region of the lateral crus 21 located slightly below the patella region to the vicinity 16 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus; and a portion having a strong straining force which ranges from the upper region of the medial crus 22 located slightly below the patella region to the vicinity 24 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 23 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus.

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(5) It is also preferable that the leg protection garment of the present invention further has a portion having a strong straining force (D) comprising a lateral portion which ranges from the vicinity of the trochanter major to the patella region 35 by way of the vicinity over the tractus iliotibialis and/or the musculus vastus lateralis, and further ranges from the patella region 35 to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a medial portion which ranges from the medial side of the femur 38 to the patella region 35 by way of the musculus vastus medialis 39 so as to support the musculus vastus medialis, and which further ranges from the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

Moreover, it is specifically preferable that the portion (D) comprises the lateral portion which ranges from the trochanter major 2 to the side face of the patella region 35 by way of the vicinity of the tractus iliotibialis 33 and the musculus vastus lateralis 34, and further ranges from the side face of the patella region 35 to the vicinity 16 of an area above the ankle by way of the vicinity over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and the medial portion which ranges from the medial side of the femur 38 to the side face of the patella region 35 by way of the portion 39 over the musculus vastus medialis without crossing the muscle belly of the musculus vastus medialis so as to support the musculus vastus medialis, and further ranges from the side face of the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity 42 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

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(6) It is also preferable that the leg protection garment of the present invention further has a portion having a strong straining force (D') comprising a lateral portion which ranges from the outside 31 of the hip to the patella region 35 by way of the portion 32 over the musculus gluteus maximus, the trochanter major 2 and the vicinity over the tractus iliotibialis and/or the musculus vastus lateralis, and further ranges from the patella region 35 to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a medial portion which ranges from the medial side 38 of the femur to the patella region 35 by way of the portion 39 over the musculus vastus medialis so as to support the musculus vastus medialis, and further ranges from the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

Moreover, it is specifically preferable that the portion (D') comprises a lateral portion which ranges from the outside 31 of the hip to the side face of the patella region 35 by way of the portion 32 over the musculus gluteus maximus, the trochanter major 2, the vicinity 33 over the tractus iliotibialis and the vicinity 34 over the musculus vastus lateralis, and further ranges from the side face of the patella region 35 to the vicinity 16 of an area above the ankle by way of the vicinity 15 of the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and the medial portion which ranges from the medial side 38 of the femur to the side face of the patella region 35 by way of the portion 39 over the musculus vastus medialis without crossing the muscle belly of the musculus vastus medialis so as to support the musculus vastus medialis, and further ranges from the side face of the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity 42 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

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(7) It is also preferable that the leg protection garment of the present invention further has the portion (E) ranges from the upper region 51 of the lateral crus located slightly below the patella region to the vicinity 54 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so

as to support the musculus gastrocnemius and the musculus soleus, wherein the portion passes the vicinity of the tendon region located below the musculus gastrocnemius without crossing the muscle belly of the musculus gastrocnemius at the angle with respect to the direction of the muscle belly of the musculus gastrocnemius. Moreover, it is specifically preferable that the portion (E) ranges from the upper region 51 of the lateral crus located slightly below the patella region to the vicinity 54 of an area above the ankle by way of the vicinity 52 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus, wherein the portion obliquely crosses the tendon region 53 located below the muscle belly of the musculus gastrocnemius without crossing the muscle belly of the musculus gastrocnemius.

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(8) Furthermore, it is preferable in the leg protection garment of the present invention that the portion having a strong straining force is formed in a way in which a predetermined shaped stretchable fabric is overlapped with the garment main part by stitching or adhering.

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(9) Furthermore, it is preferable in the leg protection garment of the present invention that the portion having a strong straining force is formed in a way in which a predetermined shaped stretchable fabric is stretched and overlapped with the garment main part by stitching or adhering.

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(10) Furthermore, it is preferable in the leg protection garment of the present invention that the portion having a strong straining force is formed in a way in which elastic resin is impregnated or elastic resin film is adhered to the predetermined location of the garment main part.

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(11) Furthermore, it is preferable in the leg protection garment of the present invention that the portion having a strong straining force is a portion using an elastic fiber having a thicker thickness than that of any other location in fiber material constituting the garment main part.

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(12) Furthermore, it is preferable in the leg protection garment of the present invention that the portion having a strong straining force is a portion which comprises texture of a knitted fabric having a stronger straining force than texture of a knitted fabric of stretchable fabric constituting the garment main part.

(13) Furthermore, it is preferable in the leg protection garment of the present invention that the portion having a strong straining force has a straining force of 30 to 400 gf.

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BREIF DESCRIPTION OF DRAWINGS

[0011]

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Fig. 1 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 2 is a rear view of a leg protection garment of the present invention.

Fig. 3 is a side view of a leg protection garment of the present invention seen from the outside.

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Fig. 4 is a rear view of a leg protection garment of the present invention.

Fig. 5 is a rear view of a leg protection garment of the present invention.

Fig. 6 is a side view of a leg protection garment of the present invention seen from the outside.

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Fig. 7 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 8 is a rear view of a leg protection garment of the present invention.

Fig. 9 is a side view of a leg protection garment of the present invention seen from the outside.

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Fig. 10 is a rear view of a leg protection garment of the present invention.

Fig. 11 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 12 is a rear view of a leg protection garment of the present invention.

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Fig. 13 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 14 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 15 is a rear view of a leg protection garment of the present invention.

Fig. 16 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 17 is a side view of a leg protection garment of the present invention seen from the outside.

5 Fig. 18 is a rear view of a leg protection garment of the present invention.

Fig. 19 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 20 is a rear view of a leg protection garment of the present invention.

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Fig. 22 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 23 is a side view of a leg protection garment of the present invention seen from the outside.

15 Fig. 24 is a rear view of a leg protection garment of the present invention.

Fig. 25 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 26 is a front view of a leg protection garment of the present invention.

20 Fig. 27 is a side view of a leg protection garment of the present invention seen from the inside.

Fig. 28 is a rear view of a leg protection garment of the present invention.

Fig. 29 is a side view of a leg protection garment of the present invention seen from the outside.

25 Fig. 30 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 31 is a side view of a leg protection garment of the present invention seen from the outside.

30 Fig. 32 is a side view of a leg protection garment of the present invention seen from the outside.

Fig. 33 is a rear view of a leg protection garment of the present invention.

Fig. 34 is a front view of a leg protection garment of the present invention.

35 Fig. 35 is a rear view of a leg protection garment of the present invention.

Fig. 36 is a rear view of a leg protection garment of the present invention.

Fig. 37 is a rear view of a leg protection garment of the present invention.

40 Fig. 38 is a rear view of a leg protection garment of the present invention.

Fig. 39 is a skeleton and partial muscle chart of the leg seen from the back.

Fig. 40 is a skeleton and partial muscle chart of the leg seen from the front.

45 **BEST MODE FOR CARRYING OUT THE INVENTION**

[0012] Hereinafter, the specific embodiments of the present invention will be explained with reference to the figures. In the present invention, when we explain where in the garment of the present invention a portion having a strong straining force primarily exhibiting a taping function is located, that is, the location in the garment where the portion having a strong straining force is located, we often use the names of the body regions or the portions corresponding to the muscles or the skeleton. Therefore, for an ease of understanding, first we will explain the locations of the skeleton and the muscles of the human body, which we use for explaining the location numbers of the portions having a strong straining force.

[0013] Fig. 39 is a skeleton and partial muscle chart of the leg seen from the back.

50 [0014] In Fig. 39, numeral 60 denotes the musculus gluteus maximus; 61 denotes the trochanter major; 62

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denotes the tractus iliotibialis; 63 denotes the musculus biceps femoris; 64 denotes the musculus adductor magnus; 65 denotes musculus semitendinosus; 66 denotes musculus semimembranosus; 67 denotes the caput fibulae; 68 denotes the musculus gastrocnemius; and 69 denotes the musculus soleus.

[0015] Furthermore, Fig. 40 is a skeleton and partial muscle chart of the leg from the front side.

[0016] In Fig. 40, numeral 70 denotes the musculus tensor fasciae latae; 71 denotes the musculus vastus lateralis; 72 denotes the patella; and 73 denotes the tibia.

5 [0017] Moreover, in the present invention, the wording "in the vicinity of —" is used to explain the location of the garment on which the portions having a strong straining force is located. It signifies that the somewhat dislocation from the predetermined location is admissible within a scope enabling the achievement of the purposes of the present invention.

[0018] In the garment of the present invention, the intended garment can be obtained by using portions having a strong straining force (A), (A'), (B), (B'), etc. singly or in appropriate combinations thereof, and furthermore by applying, if necessary, at least one of (C), (D), (E), etc. However, since there are numerous numbers of such combinations, we show the figures of the representative examples of the leg protection garment of the present invention and will explain them hereinafter. Therefore, the leg protection garment of the present invention is not limited to the garments shown in the figures. Moreover, it is essential for the leg protection garment of the present invention to have a leg portion, and so garments which do not have leg portions, for example, skirts, etc. are not included in the leg protection garment of the present invention. A garment having a lower half of the body part that is applied in close contact with the leg region such as tights (hereinafter, tights will be used for an abbreviation) is included in the garment of the present invention. Moreover, the width of the portion having a strong straining force in figures is not limited to the width represented in figures, and can appropriately be modified within the scope of not hindering the effects of the present invention. Furthermore, in figures, in a case where the portion having a strong straining force is divided into two directions or the portions having a strong straining force are crossing each other, most figures show each portion having a strong straining force individually so as to clarify the effect. However, the contacting place or crossing place of each portion having a strong straining force may be continuous one portion and is not limited to the portion having a strong straining force shown in figures. Hereinafter, each portion having a strong straining force will be explained with reference to tights.

10 [0019] Figs. 1 to 4 are figures showing a leg protection garment (1) of one embodiment of the present invention for explaining a leg protection garment having only strong straining force 101 (A) as a portion having a strong straining force. Fig. 1 is a side view of tights of an ankle length seen from the outside; Fig. 2 is a rear view of tights of an ankle length; Fig. 3 is a side view of tights of below-knee length seen from the outside; and Fig. 4 is a rear view of tights of below-knee length. It is necessary for the leg protection garment of the present invention to have at least a lower half of the body part having a leg portion of length capable of covering the patella region. Specifically in the case of tights, the length of capable of covering the patella region generally means the length being longer than below-knee length. In the present invention, the tight of such length will be explained mainly with reference to mainly ankle length tights as representative examples. However, a shorter length than ankle length, for example, below-knee length may be employed. Moreover, some embodiments of the portion having a strong straining force, for example, an embodiment in which the portion having a strong straining force extends to the vicinity of the ankle, need to be longer than below-knee length.

15 [0020] The portion having a strong straining force 101 (A) will be explained with reference to Figs. 1 and 2. The portion having a strong straining force 101 ranges from an area 1 above the trochanter major to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity 3 over the boundary between the musculus biceps femoris and the tractus iliotibialis so as to support the musculus biceps femoris, wherein the portion obliquely crosses the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris. The effect is, by supporting the musculus biceps femoris from the side, to help the musculus biceps femoris to contract, and in turn to support the flexion of the articulation genus, the extension of articulation coxae, and the excycloduction of the articulation genus at the time of semiflexing the knee. Moreover, the effect of the support is: by supporting a predetermined muscle, the musculus biceps femoris in this case, a massage effect is generated and the flow of blood and lymphocyte is promoted, so that energy consumption or accumulation of lactic acid can be reduced and the recovery of the muscle fatigue can be improved. Moreover, since the portion having a strong straining force (A) does not cross the muscle belly of the musculus biceps femoris, the muscle contraction is not inhibited.

20 [0021] Fig. 7 is a side view of a leg protection garment (1) of one embodiment of the present invention seen from the outside for explaining that the above mentioned portion having a strong straining force 101 (A) further has a portion having a strong straining force 102 that passes the portion 6 over the musculus tensor fasciae latae in an area above the trochanter major.

25 [0022] Moreover, as shown in Fig. 7, it is preferable that the portion having a strong straining force 101 (A) has the portion having a strong straining force 102 that passes the portion 6 over the musculus tensor fasciae latae in an area above the trochanter major. The musculus tensor fasciae latae is a muscle that passes over the trochanter major and plays a role in preventing the trochanter major from dislocating. Therefore, in addition to the above mentioned effect, the portion having a strong straining force has an effect of strengthening the trochanter major by supporting the musculus tensor fasciae latae from the upside.

30 [0023] Fig. 8 is a rear view showing a leg protection garment (1) of one embodiment of the present invention for explaining that the above mentioned portion having a strong straining force 101 (A) has a portion having a strong straining force 103 that ranges from the vicinity 5 of the upper end of the fibula to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus.

5 [0024] Moreover, as shown in Fig. 8, it is preferable that the portion having a strong straining force 101 (A) has the portion having the strong straining force 103 which further ranges from the vicinity 5 of the upper end of the fibula to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus. The effect is, by extending the portion having a strong straining force 101 (A) shown in Figs. 1 and 2, to further increase the effect of supporting the musculus biceps femoris, the same effect as that of the portion having a strong straining force 101 (A). Moreover, the effect of supporting musculus biceps femoris is improved, however, from the viewpoint of feeling of wearing, however, one having only the above mentioned portion having a strong straining force 101 (A) which does not extend to the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus, is more excellent.

10 [0025] Figs. 5 and 6 are figures showing a leg protection garment (1) of one embodiment of the present invention for explaining the leg protection garment having only a portion having a strong straining force 104 (B) as a portion having a strong straining force. Fig. 5 is a rear view of tights, and Fig. 6 is a side view of a tights seen from the outside, respectively.

15 [0026] The portion having a strong straining force 104 (B) will be explained with reference to Figs. 5 and 6. The portion having a strong straining force 104 ranges from an area above the musculus semimembranosus 11 to the vicinity 14 of the upper end of the fibula by way of the vicinity 12 over the boundary between the musculus semimembranosus and the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion obliquely crosses the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus. The effect is, by supporting the musculus semitendinosus and the musculus semimembranosus from the side by the portion having a strong straining force, to help the musculus semitendinosus and the musculus semimembranosus to contract. As a result, by supporting the musculus semitendinosus, the flexion of the articulo genus, the extension of the articulo coxae, and an intorsion of the lower leg at the time of semiflexing the knee are supported. Moreover, the effect by the support of the musculus semitendinosus and the musculus semimembranosus is the same as that of the musculus biceps femoris in the above mentioned a portion having a strong straining force (A).

20 [0027] Fig. 9 is a side view showing a leg protection garment (1) of one embodiment of the present invention for explaining the leg protection garment in which the above mentioned portion having a strong straining force 104 (B) further has a portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 of the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

25 [0028] Moreover, as shown in Fig. 9, it is preferable that the portion having a strong straining force 104 (B) further has the portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus. The effect is to support the musculus gastrocnemius and the musculus soleus.

30 [0029] Figs. 10 and 11 are figures showing a leg protection garment (1) of one embodiment of the present invention for explaining the leg protection garment having the portions having a strong straining force 101 (A) and 104 (B) as the portion having a strong straining force. Fig. 10 is a rear view of tights, and Fig. 11 is a side view of tights seen from the outside, respectively. The leg protection garment of an embodiment combining the portions having a strong straining force (A) and (B) has an effect combining both the support of the musculus biceps femoris by the portion having a strong straining force (A) and the support of the musculus semitendinosus and the musculus semimembranosus by the portion having a strong straining force (B).

35 [0030] Figs. 12 and 13 are figures showing a leg protection garment (2) of one embodiment of the present invention for explaining a leg protection garment having portions having a strong straining force 101 (A) and 106 (B') as the portion having a strong straining force. Fig. 12 is a rear view of tights, and Fig. 13 is a side view of tights seen from the outside, respectively.

40 [0031] The portion having a strong straining force 106 (B') will be explained with reference to Fig. 12. The portion having a strong straining force 106 (B') ranges from the vicinity 13 of the tendon region located below the muscle bellies of both the musculus semitendinosus and musculus semimembranosus (namely, the crossing place to the portion having a strong straining force 101 (A)) to the vicinity 14 of the fibula, and is a part of the portion having a strong straining force 104 (B).

45 [0032] The effect of the above mentioned leg protection garment is mainly to support the musculus biceps femoris by the portion having a strong straining force (A), and also to support the musculus semitendinosus and the musculus semimembranosus by the portion having a strong straining force (B').

50 [0033] Fig. 14 is a side view showing a leg protection garment (2) of one embodiment of the present invention for explaining a leg protection garment in which the portion having a strong straining force 101 (A) of the leg protection garment according to Figs. 12 and 13 further has the portion having a strong straining force 102 which passes the portion 6 over the musculus tensor fasciae latae in an area above the trochanter major.

55 [0034] Fig. 15 is a rear view showing a leg protection garment (2) of one embodiment of the present invention for explaining the leg protection garment in which the portion having a strong straining force 101 (A) of the leg protection garment according to Fig. 14 further has a portion having the strong straining force 103 which ranges from the vicinity 5 of the upper end of the fibula to the vicinity 7 over attaching region of the musculus semitendinosus and the musculus semimembranosus.

[0035] Fig. 16 is a side view showing a leg protection garment (2) of one embodiment of the present invention

seen from the outside for explaining the leg protection garment in which the portion having a strong straining force 106 (B') of the leg protection garment according to Figs. 12 and 13 further has a portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of the upper region of the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

[0036] Fig. 17 is a side view showing a leg protection garment (2) of one embodiment of the present invention seen from the outside for explaining a leg protection garment in which the portion having a strong straining force 106 (B') of the leg protection garment according to Fig. 15 further has the portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

[0037] Moreover, as shown in Figs. 14 to 17, it is preferable from the same reason as in the above mentioned leg protection garment (1) that the portion having a strong straining force 101 (A) has, in an area above the trochanter major, the portion having a strong straining force 102 that passes the portion 6 over the musculus tensor fasciae latae; the portion having a strong straining force 101 (A) further has the portion having a strong straining force 103 that ranges from the vicinity 5 of the upper region of the tibia to the vicinity 7 over the attaching region over the musculus semitendinosus and the musculus semimembranosus; and the portion having a strong straining force 106 (B') has the portion having a strong straining force 105 that ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

[0038] Figs. 18 and 19 are views showing a leg protection garment (3) of one embodiment of the present invention for explaining a leg protection garment having the portion having a strong straining force 107 (A') and 104 (B) as the portion having a strong straining force. Fig. 18 is a rear view of tights, and Fig. 19 is a side view of tights seen from the outside, respectively.

[0039] The a portion having a strong straining force 107 (A') will be explained with reference to Fig. 18. The a portion having a strong straining force 107 (A') ranges from the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris (namely, the portion crossing to the portion having a strong straining force 104 (B)) to the vicinity 5 of the upper end of the tibia, and is a part of the portion having a strong straining force 101 (A).

[0040] The effect of the above mentioned leg protection garment is to mainly support the musculus semitendinosus and musculus semimembranosus by the portion having a strong straining force 104 (B) and also to support the musculus biceps femoris by the portion having a strong straining force 107 (A').

[0041] Figs. 20 and 21 are views showing a leg protection garment (3) of one embodiment of the present invention for explaining a leg protection garment in which the portion having a strong straining force 107(A') of the leg protection garment according to Figs. 18 and 19 further has the portion having a strong straining force 103 which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus 7. Fig. 20 is a rear view, and Fig. 21 is a side view seen from the outside, respectively.

[0042] Fig. 22 is a side view showing a leg protection garment (3) of one embodiment of the present invention seen from the outside for explaining a leg protection garment in which the portion having a strong straining force 104 (B) in the leg protection garment according to Figs. 18 and 19 further has the portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

[0043] Fig. 23 is a side view showing a leg protection garment (3) of one embodiment of the present invention seen from the outside for explaining a leg protection garment in which the portion having a strong straining force 104 (B) of the leg protection garment according to Figs. 20 and 21 further has the portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

[0044] Moreover, as shown in Figs. 20 to 23, it is preferable from the same reason as in the above mentioned leg protection garment (1) that the portion having a strong straining force 107 (A') further has the portion having a strong straining force 103 which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus; and that the portion having a strong straining force 104 (B) further has the portion having a strong straining force 105 which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

[0045] Figs. 24 and 25 are views of a leg protection garments of one embodiment of the present invention (4) for specifically explaining that a portion having a strong straining force (C) is added as the portion having a strong straining force. This is an embodiment in which the portion having a strong straining force (A) and (B) are combined. Fig. 24 is a rear view of tights, and Fig. 25 is a side view of tights seen from the outside, respectively.

[0046] The portion having a strong straining force (C) will be explained with reference to Fig. 24. The portion having a strong straining force (C) comprises a portion having a strong straining force 108 which ranges from the upper region of the lateral crus 21 located slightly below the patella region to the vicinity 16 of an area above

the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a portion having a strong straining force 109 which ranges from the region of the medial crus 22 located slightly below the patella region to the vicinity 24 of an area above the ankle by way of the vicinity 23 over the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus. The effect is to support the musculus gastrocnemius and the musculus soleus.

[0047] Figs. 26 to 29 are views of a leg protection garment (5) of one embodiment of the present invention for specifically explaining that a portion having a strong straining force (D) is added as the portion having a strong straining force. This is an embodiment in which the portion having a strong straining force (D) is combined with the portion having a strong straining force (A). Fig. 26 is a front view of tights, Fig. 27 is a side view of tights seen from the inside, Fig. 28 is a rear view of tights, and Fig. 29 is a side view of tights seen from the outside, respectively.

[0048] First, the external portion 110 of a portion having a strong straining force (D) will be explained with reference to Fig. 29. The portion having a strong straining force (D) ranges from the trochanter major 2 to the side face of the patella region 35 by way of the portion 33 over the tractus iliotibialis and the portion 34 over the musculus vastus lateralis and further ranges from the side face of the patella region 35 to the vicinity 16 of an area above the ankle by way of the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus. The effect is, to support the musculus quadriceps femoris, i.e. the muscle of the anterior side of the femoral region in an area above the patella region; and to support the musculus gastrocnemius and the musculus soleus in an area below the patella region.

[0049] Secondly, the inner side 111 of the portion having a strong straining force (D) will be explained with reference to Fig. 27. The portion having a strong straining force (D) ranges from the medial side 38 of the femur to the side face of the patella region 35 by way of the musculus vastus medialis 39 so as to support the musculus vastus medialis without crossing the muscle belly of the musculus vastus medialis, and further ranges from the side face of the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity 42 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus. The effect is to support the musculus vastus medialis in an area above the patella region; and to support the musculus gastrocnemius and the musculus soleus in an area below the patella region.

[0050] Moreover, the knee region will be explained in detail with reference to Fig. 26. It is preferable in the external portion 110 that the structure is employed in which two mountain shapes 40 and 41 are formed in the medial portion above and below the patella regions 35 while avoiding the patella region 35; in the inner portion 111, the structure is employed in which two mountain shapes 36 and 37 are formed in the lateral portion above and below the patella region 35 while avoiding the patella region 35; and at the same time, each of the facing two mountain shapes 40 and 41 and two mountain shapes 36 and 37 are crossing. According to such a structure in the knee region, the garment of the present invention has an effect to support the ligamentum patellae or the ligamentum collaterale.

[0051] Fig. 30 is a side view showing a leg protection garment (5) of one embodiment of the present invention seen from the outside. In Fig. 30, the portions having a strong straining force (A) and (D) are made by one continuous fabric, unlike the garment of Figs. 26 to 29 where the portions having a strong straining force (A) and (D) are made by individually separated fabrics. Also in Fig. 30, the width of the part above the trochanter major of the portion having a strong straining force (A) is wider than that shown in Fig. 29. Fig. 30 is employed as one preferable embodiment of the leg protection garment (5).

[0052] Figs. 34 and 35 are views showing a leg protection garment (5) of one embodiment of the present invention where the upper half of the body part is added to the leg protection garment according to Fig. 30. Fig. 34 is a front view of the garment, and Fig. 35 is a rear view of the garment, respectively.

[0053] The leg protection garment of the present invention is a garment having at least a lower half of the body part, however, it may have the upper half of the body part like the leg protection garments of Figs. 34 and 35. In Figs. 34 and 35, numerals 80 and 81 denote upper half of the body parts. However, the leg protection garment having an upper half of the body part is not limited to the above mentioned embodiments alone and may be applied to every other embodiment.

[0054] Fig. 31 is a side view showing a leg protection garment (6) of one embodiment of the present invention seen from the outside for specifically explaining that a portion having a strong straining force (D') is added as the portion having a strong straining force.

[0055] As shown in Fig. 31, the portion having a strong straining force (D'), in an area above the trochanter major 2 of the portion having a strong straining force (D), has an extended portion having a strong straining force 112 which ranges from the outside 31 of the hip to the trochanter major 2 by way of the portion 32 over the musculus gluteus maximus. The extended portion having a strong straining force 112 above the trochanter major 2 has an effect of supporting the musculus gluteus maximus.

[0056] Figs. 32 and 33 are views showing a leg protection garment (7) of one embodiment of the present invention for specifically explaining that the portion having a strong straining force 113 (E) is added as the portion having a strong straining force. They are employed as embodiments in which the portion having a strong straining force (E) is combined with the portion having a strong straining force (A). Fig. 32 is a side view of tights seen from the outside, and Fig. 33 is a rear view of tights, respectively.

[0057] The portion having a strong straining force 113 (E) will be explained with reference to Figs. 32 and 33. The portion having a strong straining force 113 ranges from the upper region 51 of the lateral crus located slightly below the patella region to the vicinity 54 of an area above the ankle by way of the vicinity 52 over the boundary between the musculus gastrocnemius and the musculus soleus so as to support the musculus gastrocnemius and the

musculus soleus, wherein the portion obliquely crosses the tendon region 53 located below the muscle belly of the musculus gastrocnemius without crossing the muscle belly of the musculus gastrocnemius. The effect is to support the musculus gastrocnemius and the musculus soleus.

[0058] As mentioned above, the specific embodiments of the present invention are explained with reference to Figs. 1 to 35. As mentioned above, the leg protection garment of the present invention is not limited to the embodiments shown in figures. For example, in Figs. 1 to 35, the vicinity 5 of the upper end of the tibia and the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus are shown to be located in the relatively upper location in the portion having a strong straining force (A); and an area 11 above the musculus semimembranosus and the vicinity 12 over the boundary between the musculus semimembranosus and the musculus adductor magnus 12 are shown to be located in the relatively upper location in the portion having a strong straining force (B). For references, views in which the above mentioned locations are located lower are shown in Figs. 36 to 38 as examples.

[0059] Fig. 36 is an example in which the vicinity 5 of the upper end of the tibia and the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus in the portion having a strong straining force (A) are located at relatively lower location. Fig. 36 is a rear view of the leg protection garment in which the portion having a strong straining force 101 (A) has the portion having a strong straining force 102 which passes over the portion 6 over the musculus tensor fasciae latae in the upper portion of the trochanter major, and the portion having a strong straining force 103 which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus.

[0060] Fig. 37 is an example of a leg protection garment in which an area 11 above the musculus semimembranosus and the vicinity 12 over the boundary between the musculus semimembranosus and the musculus adductor magnus in the portion having a strong straining force (B) are located at relatively lower location. Fig. 37 is a rear view of a leg protection garment having only the portion having a strong straining force 104 (B).

[0061] Fig. 38 is rear view of a leg protection garment combining the portion having a strong straining force (A) according to Fig.36 and the portion having a strong straining force (B) according to Fig.37.

[0062] The leg protection garment of the present invention is formed by stretchable fabric and has a portion whose straining force is partially strong (a portion having a strong straining force).

[0063] As the method for providing the portion having a strong straining force in the leg protection garment of the present invention, the portion having a strong straining force may be formed in a way in which a predetermined shaped stretchable fabric is overlapped with the garment main part by stitching, and may be formed in a way in which a predetermined shaped stretchable fabric is overlapped with the garment main part by adhering. According to these methods, a garment having a durability can easily be manufactured. Needless to say, each part of a portion having a strong straining force and other parts may be made as the predetermined shapes of individual parts and sewed into one to thus form the leg protection garment of the present invention, however, such a method requires complicated sewing and takes somewhat much labor and time.

[0064] In addition, for example, the portion having a strong straining force may be formed in a way in which the predetermined shaped stretchable fabric is stretched and overlapped with the garment main part by stitching or adhering. These methods are preferred in the case of providing a stronger straining force with the portion having a strong straining force.

[0065] Moreover, the portion having a strong straining force may be formed in a way in which elastic resin is impregnated or elastic resin film is adhered to the predetermined portion of the garment main part. By such methods, the portion having a strong straining force of a relatively thin thickness can be obtained. As the elastic resin, polyurethane resin, polyester elastomer resin, or other appropriate elastic resin can be applied.

[0066] Moreover, the portion having a strong straining force may be formed by using an elastic fiber having a thicker thickness than that of any other location in fiber materials constituting the garment main part. By such a method, since overlapping is not required, the portion having a strong straining force having thinner thickness can be obtained.

[0067] Moreover, the portion having a strong straining force may be formed by a texture of a knitted fabric having a stronger straining force than a texture of knitted fabric of the stretchable fabric constituting the garment main part. Also by such a method, since overlapping is not required, the portion having a strong straining force having thinner thickness can be obtained.

[0068] Among the above mentioned methods for providing the portion having a strong straining force, the method of overlapping the predetermined shaped stretchable fabric with the garment main part by stitching and the method in which the predetermined shaped stretchable fabric is stretched and overlapped with the garment main part by stitching are preferred. Moreover, according to these methods, the straining force of the stretchable fabric stitched to the garment main part may be somewhat smaller than, or the same as, or larger than the straining force of the stretchable fabric of the garment main part. It is because as a result of a stretchable fabric being overlapped onto the garment main part, the straining force of the overlapped portion is increased. The level of the straining force of the fabric to be overlapped is appropriately determined in accordance with kinds of sports, the level of disorders of each user or the disorders to be prevented or the level of the straining force of garment main parts.

[0069] The straining force in the portion having a strong straining force is not limited, but it is preferable that the straining force is designed to be approximately 30 to 400 gf in the longitudinal direction. It is preferred in the range of straining force that the effect of the present invention can efficiently be exhibited, the compression is not too strong and the feeling of wearing is comfortable.

[0070] As the method to measure a straining force, an Instron type All Round Specimen-Extension tensile tester ("AUTOGRAPH" AG-500D made by Shimadzu Corporation) is used to conduct stretch and recovery for three times

at the speed of testing rate of stressing of 300 ± 20 mm/min to 80% of sample length (free length of test piece between grips). At the third stretch and recovery, the value in 30% stretched state and the value at the recovery are measured, and only the value at the recovery is recorded and defined as the straining force. Preferably, the size of the sample is 2.5 cm in width and 16 cm in length, wherein 2.5 cm is the length of the upper grips of the test piece, 3.5 cm in the length of the lower grips of the test piece, and 10 cm is the length for the tensile test. If such preferred size of sample cannot be cut out from the garment to be measured, samples having smaller size than the above may be used. However, the smaller the size of samples is, the greater the measurement error is. Therefore, it is preferable that the largest cuttable samples are taken and measured. Moreover, in a case where the portion having straining force is formed by overlapping a stretchable fabric onto the garment main part, the measurement sample of the portion having straining force is, needless to say, carried out on samples of the overlapped portion.

[0071] The width of the portion having a strong straining force of the leg protection garment of the present invention is not particularly limited and appropriately determined within a scope suitable to achieve the object of the present invention in accordance with the location of the portion having a strong straining force, the strength of straining force of the material to be used, the means of forming the portion having a strong straining force and the level or locations of disorders of the each user, or the purpose of preventing the disorders, whether a user is child or adult, or the like. For example, the width of the portion having the widest width is usually about 5 to 15 cm, more preferably about 8 to 13 cm. The width of the other portions having a strong straining force is: the width of the portion having the narrowest width, for example, in the lateral side of the femoral region is usually about 2 to 10 cm, more preferably about 4 to 8 cm. Needless to say, as long as the objects of the present invention can be attained, the width of the portion having a strong straining force may be partially wider or narrower as necessary.

[0072] As the stretchable fabrics used for the garment main part or each portion having a strong straining force of the leg protection garment of the present invention, power net containing polyurethane fiber that is stretchable rochelle knitted fabric containing polyurethane fiber, two directions stretchable tricot knitted fabric containing polyurethane fiber that is tricot knitted fabric containing polyurethane fiber, or the like can preferably be used. Consequently, as compared with the conventional supporters etc. using the relatively thick pile fabric or neoprene sheet etc., the fabric having a thickness required for the general garment, for example, the fabric whose thickness is about 0.3 to 0.8 mm can be used, and therefore the leg protection garment having little deterioration of appearance, for example, a proportion in use, being well fitted to the body, and having excellent ventilation can be provided. The types of power net include, for example, plain power net, satin-like power net, two directions stretchable rochelle, "Toriskin" (the product of Urabe Corporation) etc. Moreover, incidentally, in the tights according to Figs. 1 to 38, as the fabric constituting the tights main part, two directions stretchable tricot knitted fabric that is a stretchable material consisting of 80 % of polyester fiber and 20 % of polyurethane fiber (the straining force : 45 gf in the approximately horizontal direction of tights; and 33 gf in the approximately longitudinal direction of tights) was used; as the fabric lined to the portion having a straining force, power net knitted fabric that is a stretchable material consisting of 62% of nylon fiber and 38 % of polyurethane fiber (the straining force : 272 gf in the longitudinal direction of the lining materials; and 88 gf in the wide direction of the lining material) was used. However, needless to say, the fabric is not limited to them alone.

[0073] All of the portions having a strong straining force are not necessarily the same. The different straining force may be applied in accordance with the portions.

INDUSTRIAL APPLICABILITY

[0074]

(1) The leg protection garment of the present invention has a lower half of the body part which has a leg portion of length capable of covering at least the patella region and is formed of stretchable fabric, in which the garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A) and /or (B) as the portion having a strong straining force. By such an embodiment, the present invention can provide a leg protection garment in which the portion having a strong straining force supports the musculus biceps femoris from the side; helps the musculus biceps femoris to contract; and in turn supports the flexion of the articulatio genus, the extension of the articulatio coxae, and the excycloduction of the articulatio genus at the time of the semiflexion of the knee; and the portion having a strong straining force supports the musculus semitendinosus and the musculus semimembranosus from the side; helps the musculus semitendinosus and musculus semimembranosus to contract; and in turn supports the flexion of the articulatio genus, the extension of the articulatio coxae, the intorsion of the lower leg at the time of the semiflexion of the knee by supporting the musculus semitendinosus. Moreover, by supporting the musculus biceps femoris, the musculus semitendinosus and the musculus semimembranosus, in various kinds of sports requiring the flexion of the articulatio genus, disorders in the ligament of the knee or in the meniscus can be relieved. In addition, by supporting the musculus biceps femoris, the musculus semitendinosus and the musculus semimembranosus, the massage effect is generated, the flow of blood and lymphocyte is promoted, so that the recovery of the muscle fatigue due to the exhaustion of energy or the accumulation of lactic acid can be improved.

(A) a portion having a strong straining force which ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity over the musculus biceps femoris and/or the tractus iliotibialis so as to support the musculus biceps femoris, wherein the portion passes the vicinity 4 of the tendon region located below the muscle belly of the

musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris at right angle with respect to the direction of the muscle fiber;

(B) a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula by way of the vicinity over the musculus semimembranosus and/or the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion passes the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus at right angle with respect to the direction of the muscle fiber.

Moreover, in addition to the above mentioned effects, the garment of the present invention: can easily and adequately be put on and taken off if necessary, for example, when taking a bath etc. by ordinary people; therefore, does not require a treatment by the skilled person as in the case of the taping treatment and can readily be put on; and furthermore is effective for promoting the prevention or treatment of disorders etc. in the leg muscle etc.

In addition, since the portion having a strong straining force is incorporated into the garment, the tightness and looseness of the compression can be obtained by the motion without causing discomfort, that is, the portion where the taping is applied is always subjected to the compression as in the case of the taping treatment. Consequently, the leg protection garment of the present invention provides a comfortable feeling in wearing to a user due to a small supporting power when he or she does not move the body, on the other hand, it can exhibit an appropriate straining force while a user moves the body. Therefore, it provides a good comfortable feeling in use and is effective for promoting the prevention or treatment of disorders etc. in the leg muscle.

Moreover, since a tape is not closely contacted to the skin of the human body with adhesive agent as in the case of taping treatment, the hygienic problems, for example, the occurrence of itch in the skin because of becoming stuffy, can be improved.

In addition, the present invention can provide a leg protection garment which does not deteriorate an appearance, e.g. a proportion in use, and which has a relatively excellent ventilation.

In the above mentioned leg protection garment of the present invention (1), by the following embodiments (I), (II), and (III), the leg protection garment capable of supporting the musculus gastrocnemius and the musculus soleus as well can be provided:

(I) an embodiment in which the portion (A) further has a portion having a strong straining force which, in an area above the trochanter majors, passes over at least one muscle selected from the group consisting of the musculus tensor fasciae latae, the tractus iliotibialis, and the musculus gluteus medius (preferably the portion 6 over the musculus tensor fasciae latae);

(II) an embodiment in which the portion (A) further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus; and

(III) an embodiment in which the portion (B) further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus (preferably the vicinity 15 of the boundary between the musculus gastrocnemius and the musculus soleus).

(2) Moreover, the leg protection garment of the present invention has a lower part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, in which the garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A) and (B') as the portion having a strong straining force. By such an embodiment, the present invention can provide a leg protection garment capable of supporting the musculus semitendinosus and the musculus semimembranosus in addition to the main support, namely, the support of the musculus biceps femoris.

(A) a portion having a strong straining force which ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity over the musculus biceps femoris and/or the tractus iliotibialis so as to support the musculus biceps femoris from the side, wherein the portion passes the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris at right angle with respect to the direction of the muscle fiber; and

(B') a portion having a strong straining force which ranges from the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus to the vicinity 14 of the upper end of the fibula.

Moreover, in the above mentioned leg protection garment of the present invention, by the following (I), (II), and (III), the leg protection garment having the same effect as the above (1) can be provided:

(I) an embodiment in which the portion (A) further has a portion having a strong straining force which, in an area above the trochanter major, passes over at least one muscle selected from the group consisting of the musculus tensor fasciae latae, the tractus iliotibialis, and the musculus gluteus medius (preferably the portion 6 over the musculus tensor fasciae latae);

(II) an embodiment in which the portion (A) further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus; and

(III) an embodiment in which the portion (B') further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus (preferably the portion 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus.

(3) Moreover, the leg protection garment of the present invention has a lower half of the body part which has a leg portion of length capable of covering at least the patella region and is formed of stretchable fabric, wherein the garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A') and (B) as the portion having a strong straining force. By such an embodiment, the present invention can provide a garment comprising the support of the musculus biceps femoris in addition to the main support, namely, the support of the musculus semitendinosus and musculus semimembranosus.

(A') the portion having a strong straining force which ranges from the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris to the vicinity 5 of the upper end of the tibia; and

(B) the portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula by way of the vicinity over the musculus semimembranosus and/or the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein the portion passes the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus at right angle with respect to the direction of the muscle fiber.

Moreover, in the above mentioned leg protection garment, by the following embodiments (I), and (II), the leg protection garment having the same effect as the above mentioned (1) can be provided.

(I) an embodiment in which the portion (A') further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus;

(II) an embodiment in which the portion (B) further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus.

(4) Moreover, in the leg protection garment the present invention, by such a preferred embodiment where a portion having a strong straining force (C) comprises a portion having a strong straining force which ranges from the upper region of the lateral crus 21 located slightly below the patella region to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 15 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus; and a portion having a strong straining force which ranges from the upper region of the medial crus 22 located slightly below the patella region to the vicinity 24 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus (preferably the vicinity 23 over the boundary between the musculus gastrocnemius and the musculus soleus) so as to support the musculus gastrocnemius and the musculus soleus, the leg protection garment capable of supporting the musculus gastrocnemius and the musculus soleus can be provided.

(5) Moreover, in the leg protection garment the present invention, by such a preferred embodiment where a

portion having a strong straining force (D) comprises a lateral portion which ranges from the vicinity of the trochanter major to the patella region 35 by way of the vicinity over the tractus iliotibialis and/or musculus vastus lateralis, and further ranges from the patella region 35 to the vicinity 16 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a medial portion which ranges from the medial region of the femur 38 to the patella region 35 by way of the musculus vastus medialis 39 so as to support the musculus vastus medialis, and further ranges from the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; the leg protection garment capable of supporting the musculus quadriceps femoris, namely, the muscle of the anterior side of the femoral region in an area above the knee region, and supporting the musculus gastrocnemius and the musculus soleus in an area below the knee region in addition to the support by the portion having a strong straining force (A) and/or (B) can be provided. Therefore, by such a combination, the leg protection garment can support, in particular, the muscles of the anterior side and the posterior side of the femoral region with balancing. As a result, the mutual functions of the muscles of the anterior side and the posterior side of the femoral region can efficiently be exhibited, and the functions of the articulation genus and an entire function of the articulation genus can be supported.

(6) Moreover, in the leg protection garment the present invention, by such a preferred embodiment where the portion having a strong straining force (D') comprises a lateral portion which ranges from the outside 31 of the hip to the patella region 35 by way of the portion 32 over the musculus gluteus maximus, the trochanter major 2 and the portion over the tractus iliotibialis and/or the musculus vastus lateralis 34, and further ranges from the patella region 35 to the vicinity of an area above the ankle 16 by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a medial portion which ranges from the medial side 38 of the femur to the patella region 35 by way of the portion 39 over the musculus vastus medialis so as to support the musculus vastus medialis, and further ranges from the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; the leg protection garment capable of supporting the musculus gluteus maximus, in addition to the effect of the above mentioned leg protection garment (5), can be provided.

(7) Moreover, by such a preferred embodiment where the leg protection garment the present invention has a portion having a strong straining force (E) which ranges from the upper region 51 of the lateral crus located slightly below the patella region to the vicinity 54 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus, and the portion passes over the tendon region located below the musculus gastrocnemius without crossing the muscle belly of the musculus gastrocnemius at the right angle with respect to the direction of the muscle fiber; the leg protection garment capable of supporting the musculus gastrocnemius and the musculus soleus can be provided.

(8) Moreover, in the leg protection garment of the present invention, by such a preferred embodiment where the portion having a strong straining force is formed in a way in which a predetermined shaped stretchable fabric is overlapped with the garment main part by stitching or adhering, a garment having durability easily can be manufactured.

(9) Moreover, in the leg protection garment of the present invention, by such a preferred embodiment where the portion having a strong straining force is formed in a way in which a predetermined shaped stretchable fabric is stretched and overlapped with the garment main part by stitching or adhering, stronger straining force can be provided to the portion having a strong straining force.

(10) Moreover, in the leg protection garment of the present invention, by such a preferred embodiment where the portion having a strong straining force is formed in a way in which elastic resin is impregnated or elastic resin film is adhered to the predetermined portion of the garment main part, the portion having a strong straining force of a relatively thin thickness can be obtained.

(11) Moreover, in the leg protection garment of the present invention, by such a preferred embodiment where the portion having a strong straining force is a portion using an elastic fiber having a thicker thickness than that of any other location in the fiber material constituting the garment main part since overlapping is not required, the portion having a strong straining force of a relatively thin thickness can be obtained.

(12) Moreover, in the leg protection garment of the present invention, by such a preferred embodiment where the portion having a strong straining force is a portion which comprises texture of knitted fabric having a stronger straining force than texture of stretchable fabric constituting the garment main part, since overlapping is not required, the portion having straining force of a relatively thin thickness can be obtained.

(13) Moreover, in the leg protection garment of the present invention, by such a preferred embodiment where the portion having a strong straining force has 30 to 400 gf of straining force, the effect of the present invention can efficiently be exhibited and the excellent feeling of wearing can also be obtained without making a user feel too

strong compression.

(14) Moreover, in the leg protection garment of the present invention, by a preferred embodiment where the stretchable fabric is a knitted fabric selected from the group consisting of a two directions stretchable tricot knitted fabric and stretchable rochelle knitted fabric, as compared with the conventional supporters etc. using the relatively thick pile fabric or neoprene sheet etc., the fabric having such a thickness as used for manufacturing the general garments can be used. Therefore, the leg protection garment having little deterioration of appearance, for example, a proportion in use; being well fitted to the body; and having excellent ventilation, can be provided.

Claims

1. A leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, wherein said garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A) and /or (B) as the portion having a strong straining force:
 - (A) a portion having a strong straining force which ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity over the musculus biceps femoris and/or the tractus iliotibialis so as to support the musculus biceps femoris, wherein said portion passes the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris at right angle with respect to the direction of the muscle fiber;
 - (B) a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula by way of the vicinity over the musculus semimembranosus and/or the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein said portion passes the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus at right angle with respect to the direction of the muscle fiber.
2. The leg protection garment according to claim 1, wherein the portion (A) is a portion having a strong straining force which ranges from an area above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity 3 of the boundary between the musculus biceps femoris and the tractus iliotibialis so as to support the musculus biceps femoris, wherein said portion obliquely crosses the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris.
3. The leg protection garment according to claim 1 or 2, wherein the portion (A) further has a portion having a strong straining force which, in an area above the trochanter majors, passes over at least one muscle selected from the group consisting of the musculus tensor fasciae latae, the tractus iliotibialis, and the musculus gluteus medius.
4. The leg protection garment according to any one of claims 1 to 3, wherein the portion (A) further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus.
5. The leg protection garment according to any one of claims 1 to 4, wherein the portion (B) is a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula by way of the vicinity 12 of the boundary between the musculus semimembranosus and the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein said portion obliquely crosses over the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus.
6. The leg protection garment according to any one of claims 1 to 5, wherein the portion (B) further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way over the vicinity of the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.
7. A leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, wherein said garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A) and /or (B)

as the portion having a strong straining force:

(A) a portion having a strong straining force which ranges from an area 11 above the trochanter major 1 to the vicinity 5 of the upper end of the tibia by way of the trochanter major 2 and further the vicinity over the musculus biceps femoris and/or the tractus iliotibialis so as to support the musculus biceps femoris from the side, wherein said portion passes the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris without crossing the muscle belly of the musculus biceps femoris at right angle with respect to the direction of the muscle fiber;

(B') a portion having a strong straining force which ranges from the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus to the vicinity 14 of the upper end of the fibula.

8. The leg protection garment according to claim 7, wherein the portion (A) further has a portion having a strong straining force, in an area above the trochanter major, which passes over at least one muscle selected from the group consisting of the musculus tensor fasciae latae, the tractus iliotibialis, and the musculus gluteus medius.
9. The leg protection garment according to any one of claim 7 or 8, wherein the portion (A) further has a portion having a strong straining force that ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 of the attaching region of the musculus semitendinosus and the musculus semimembranosus.
10. The leg protection garment according to any one of claims 7 to 9, wherein the portion (B') further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus.
11. A leg protection garment having a lower half of the body part which has a leg portion of length capable of covering at least the patella region and formed of stretchable fabric, wherein said garment has a portion having a partially strong straining force and comprises the portion expressed by at least the following (A') and (B) as the portion having a strong straining force:
 - (A') a portion having a strong straining force which ranges from the vicinity 4 of the tendon region located below the muscle belly of the musculus biceps femoris to the vicinity 5 of the upper end of the tibia;
 - (B) a portion having a strong straining force which ranges from an area 11 above the musculus semimembranosus to the vicinity 14 of the upper end of the fibula by way of the vicinity over the musculus semimembranosus and/or the musculus adductor magnus so as to support the musculus semitendinosus and the musculus semimembranosus, wherein said portion passes the vicinity 13 of the tendon region located below the muscle belly of both the musculus semitendinosus and the musculus semimembranosus without crossing the muscle belly of the musculus semitendinosus and the musculus semimembranosus at right angle with respect to the direction of the muscle fiber.
12. The leg protection garment according to claim 11, wherein the portion (A') further has a portion having a strong straining force which ranges from the vicinity 5 of the upper end of the tibia to the vicinity 7 over the attaching region of the musculus semitendinosus and the musculus semimembranosus.
13. The leg protection garment according to claim 11 or 12, wherein the portion (B) further has a portion having a strong straining force which ranges from the vicinity 14 of the upper end of the fibula to the vicinity 16 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.
14. The leg protection garment according to any one of claims 1 to 5, 7 to 9, 11 and 12 further having a portion having a strong straining force (C) comprising a portion having a strong straining force which ranges from the upper region of the lateral crus 21 located slightly below the patella region to the vicinity 16 of an area above the ankle by way of the vicinity of the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a portion having a strong straining force which ranges from the upper region of the medial crus 22 located slightly below the patella region to the vicinity 24 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.
15. The leg protection garment according to any one of claims 1 to 5, 7 to 9, 11 and 12 further having a portion having a strong straining force (D) comprising a lateral portion which ranges from the vicinity of the trochanter major to the patella region 35 by way of the vicinity over the tractus iliotibialis and/or musculus vastus lateralis, and further ranges from the patella region 35 to the vicinity 16 of an area above the ankle by

way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a medial portion which ranges from the medial region of the femur 38 to the patella region 35 by way of the musculus vastus medialis 39 so as to support the musculus vastus medialis, and further ranges from the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.

- 5 16. The leg protection garment according to any one of claims 1 to 5, 7 to 9, 11 and 12 further having a portion having a strong straining force (D') comprising a lateral portion which ranges from the outside 31 of the hip to the patella region 35 by way of the portion 32 over the musculus gluteus maximus, the trochanter major 2 and the vicinity over the tractus iliotibialis and/or the musculus vastus lateralis 34, and which further ranges from the patella region 35 to the vicinity 16 of an area above the ankle by way of the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus; and a medial portion which ranges from the medial side 38 of the femur to the patella region 35 by way of the portion 39 over the musculus vastus medialis so as to support the musculus vastus medialis, and which further ranges from the patella region 35 to the vicinity 43 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus.
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- 15 17. The leg protection garment according to any one of claims 1 to 5, 7 to 9, 11 and 12 further having a portion having a strong straining force (E) which ranges from the upper region 51 of the lateral crus located slightly below the patella region to the vicinity 54 of an area above the ankle by way of the vicinity over the musculus gastrocnemius and/or the musculus soleus so as to support the musculus gastrocnemius and the musculus soleus, wherein the portion passes over the tendon region located below the musculus gastrocnemius without crossing the muscle belly of the musculus gastrocnemius at the right angle with respect to the direction of the muscle fiber.
- 20 18. The leg protection garment according to any one of claims 1 to 17, wherein the portion having a strong straining force is formed in a way in which a predetermined shaped stretchable fabric is overlapped with the garment main part by stitching or adhering.
- 25 19. The leg protection garment according to any one of claims 1 to 17, wherein the portion having a strong straining force is formed in a way in which a predetermined shaped stretchable fabric is stretched and overlapped with the garment main part by stitching or adhering.
- 30 20. The leg protection garment according to any one of claims 1 to 17, wherein the portion having a strong straining force is formed in a way in which elastic resin is impregnated or elastic resin film is adhered to the predetermined portion of the garment main part.
- 35 21. The leg protection garment according to any one of claims 1 to 17, wherein the portion having a strong straining force is a portion using an elastic fiber having a thicker thickness than that of any other location in fiber material constituting the garment main part.
22. The leg protection garment according to any one of claims 1 to 17, wherein the portion having a strong straining force is a portion which comprises texture of a knitted fabric having a stronger straining force than texture of a knitted fabric of stretchable fabric constituting the garment main part.
23. The leg protection garment according to any one of claims 1 to 22, wherein the portion having a strong straining force has a straining force of 30 to 400 gf.
- 40 24. The leg protection garment according to any one of claims 1 to 23, wherein the stretchable fabric is a knitted fabric selected from the group consisting of a two directions stretchable tricot knitted fabric and a stretchable rochelless knitted fabric.

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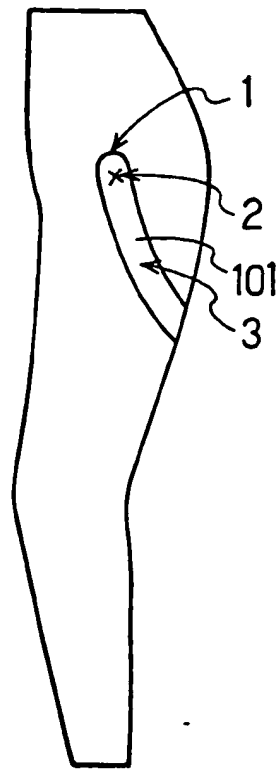


FIG. 1

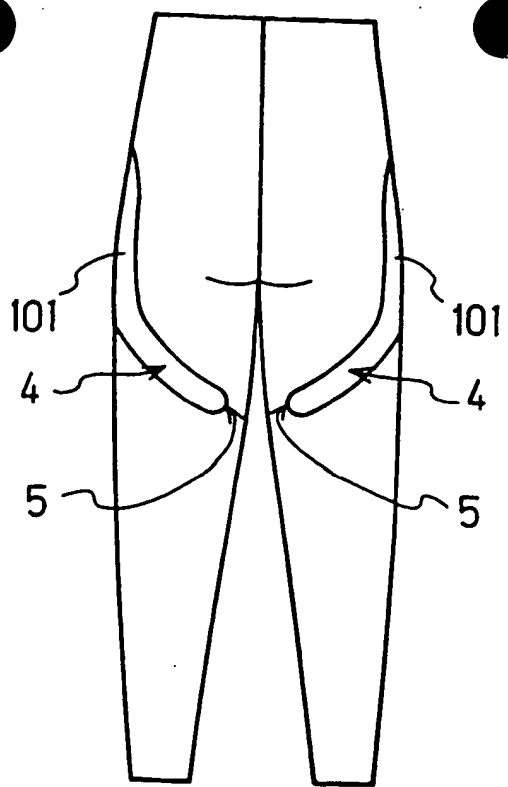


FIG. 2

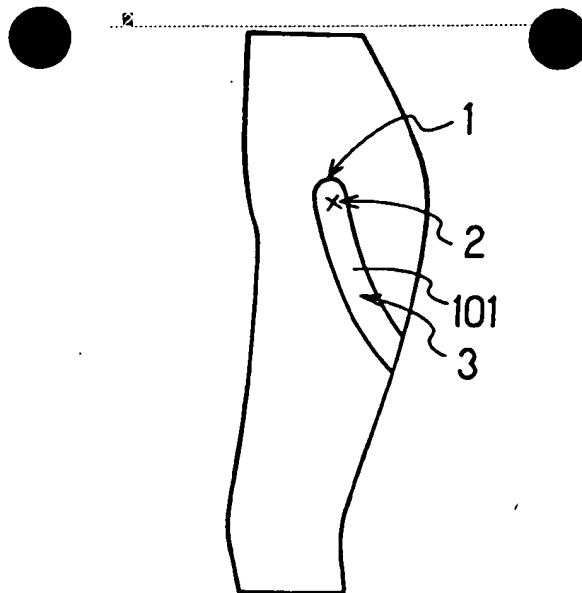


FIG. 3

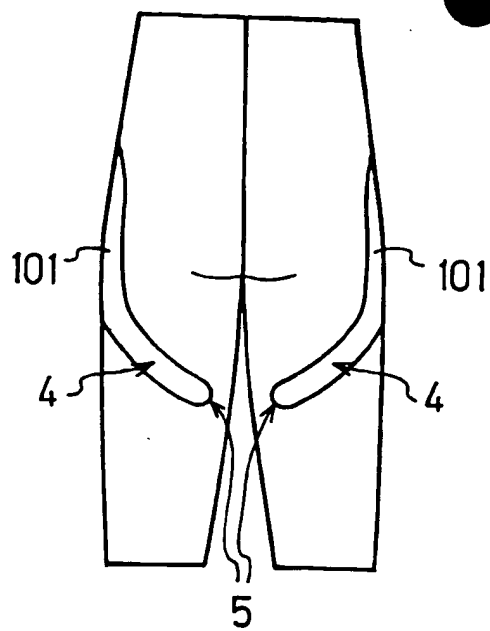


FIG. 4

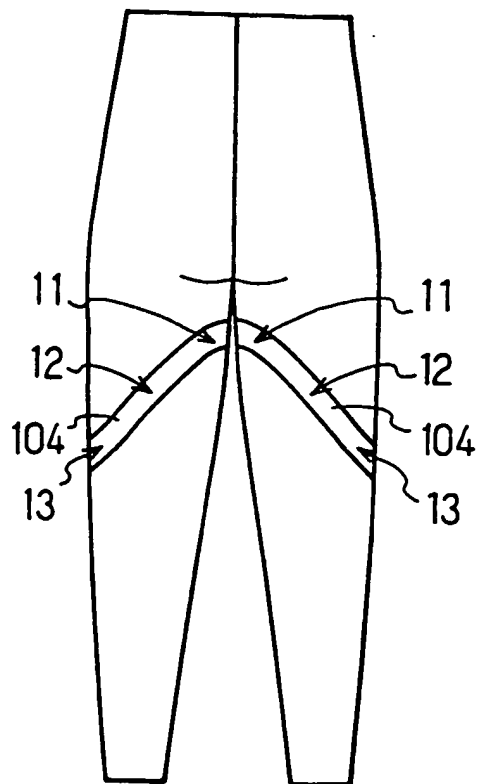


FIG. 5

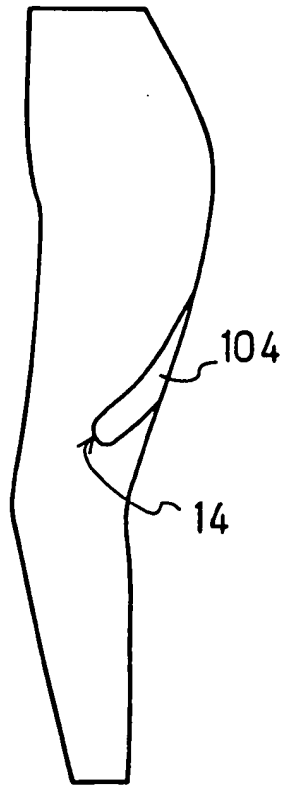


FIG. 6

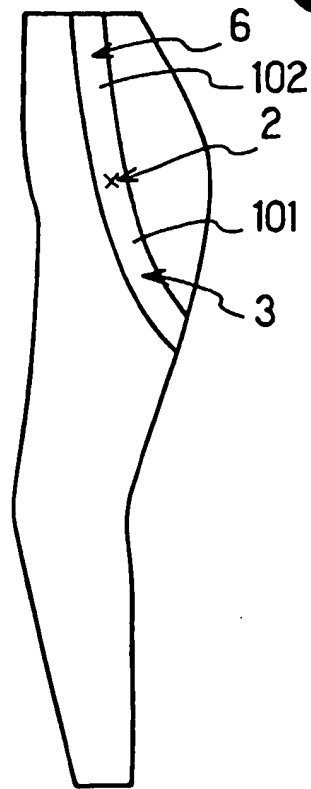


FIG. 7

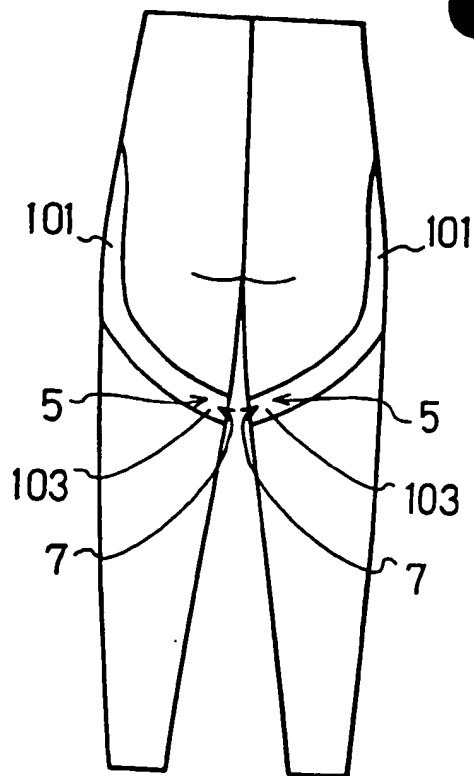


FIG. 8

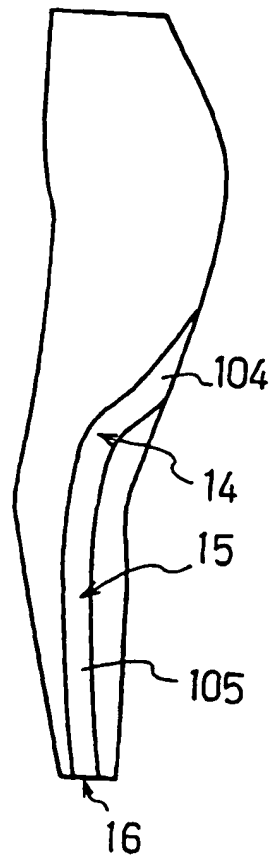


FIG. 9

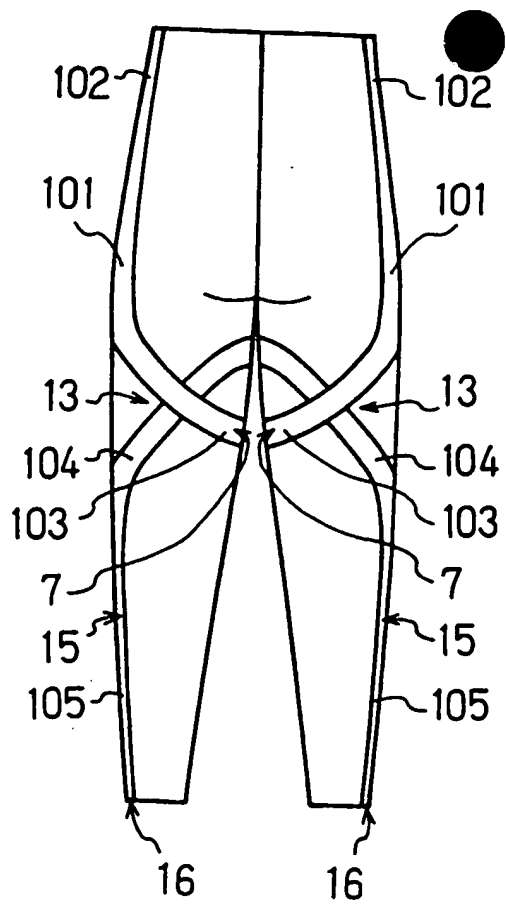


FIG. 10

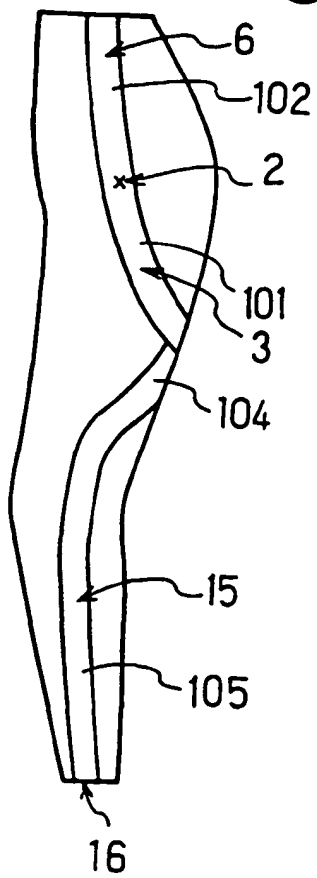


FIG. 11

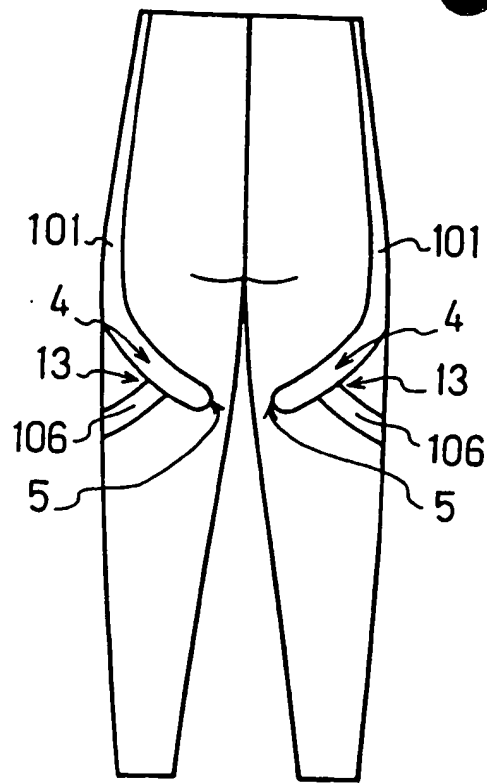


FIG. 12

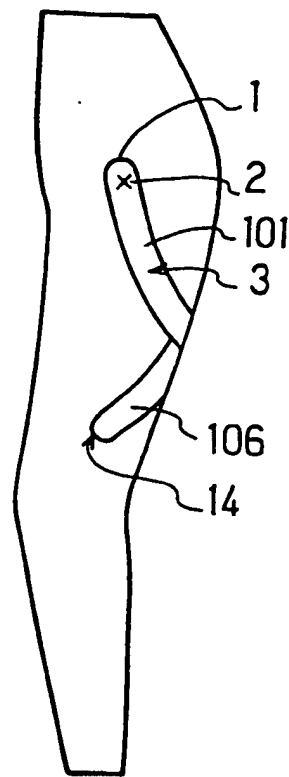


FIG. 13

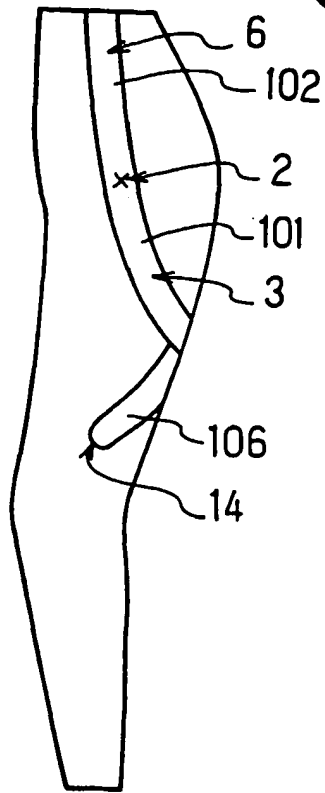


FIG. 14

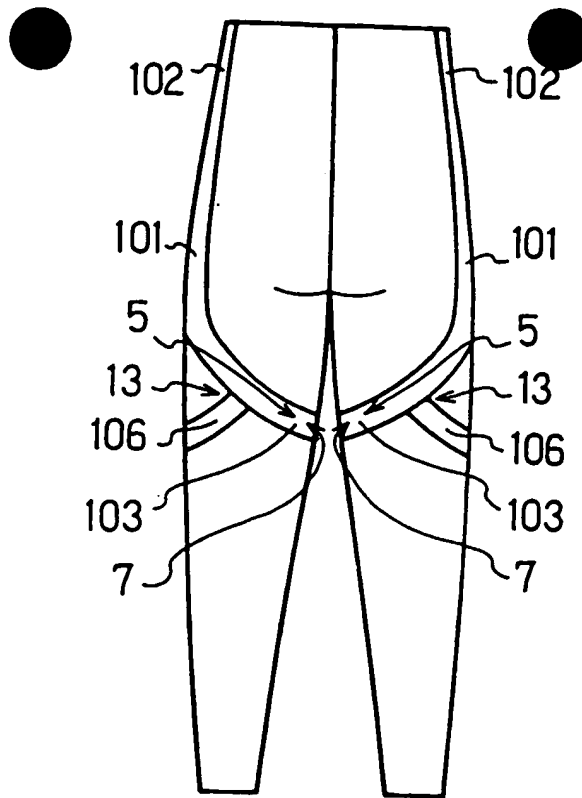


FIG. 15

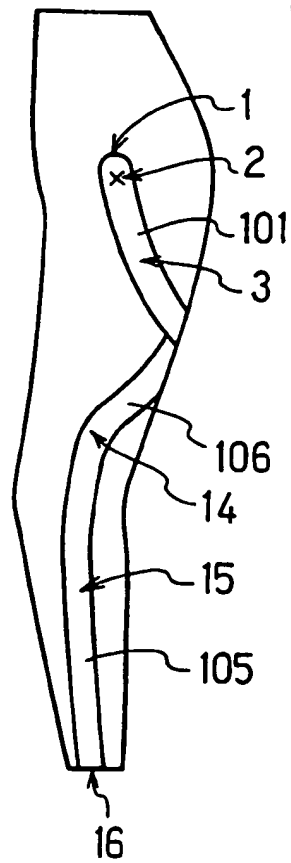


FIG. 16

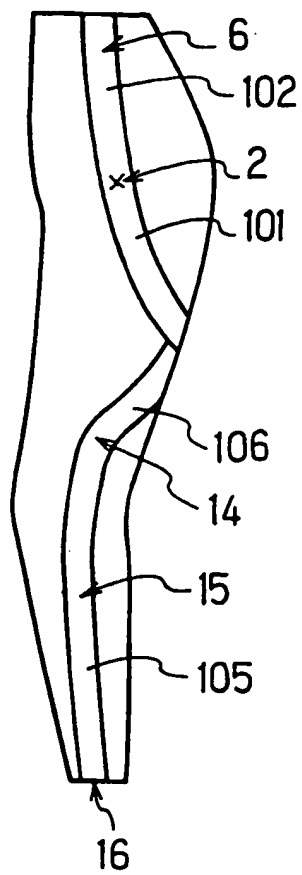


FIG. 17

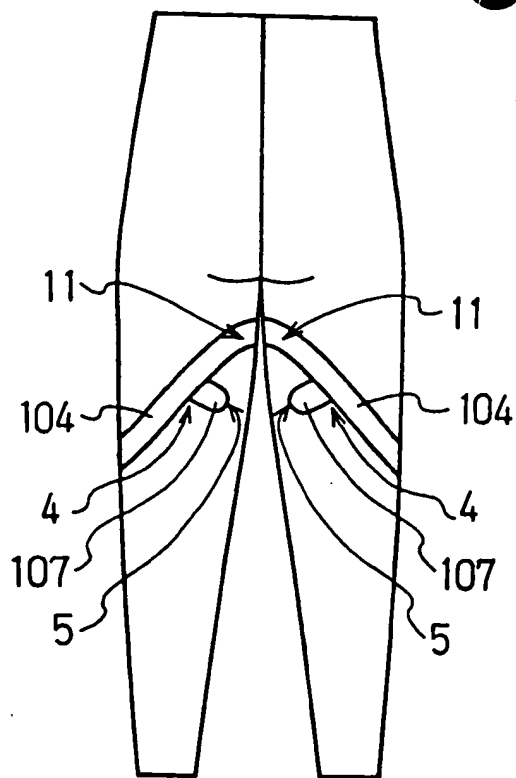


FIG. 18

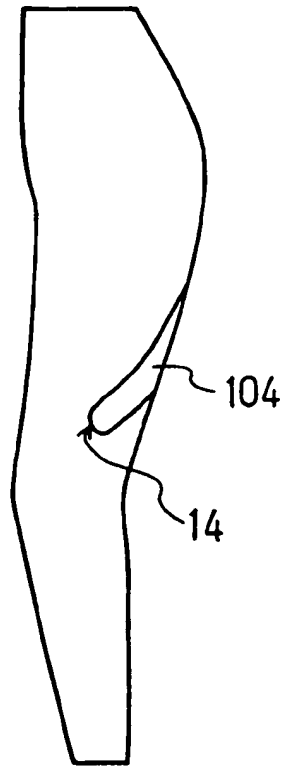


FIG. 19

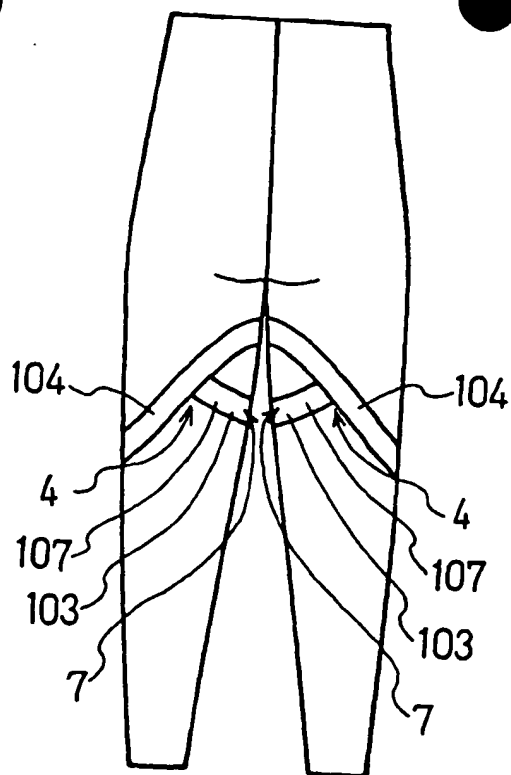


FIG. 20

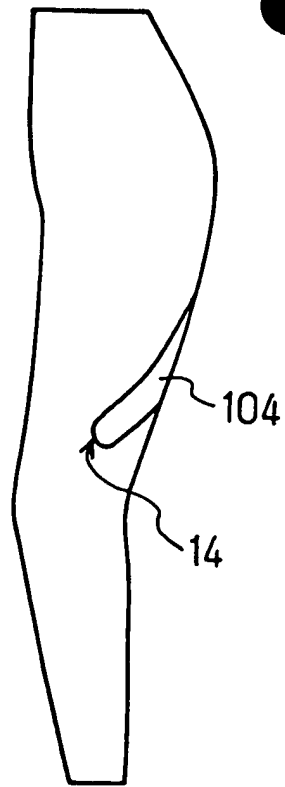


FIG. 21

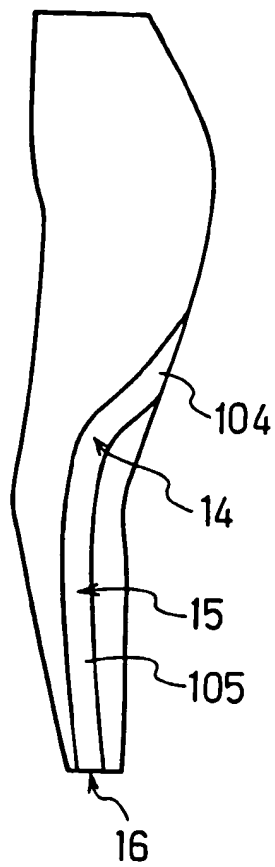


FIG. 22

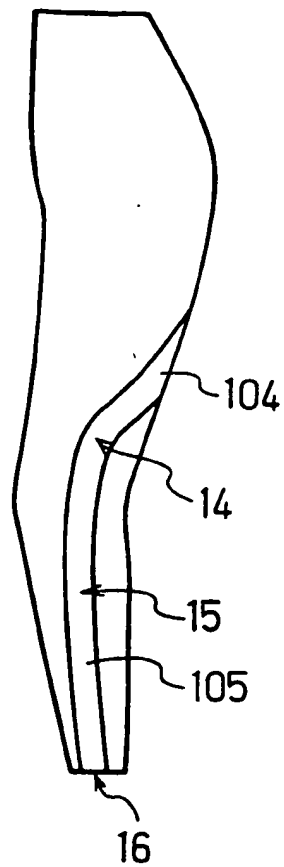


FIG. 23

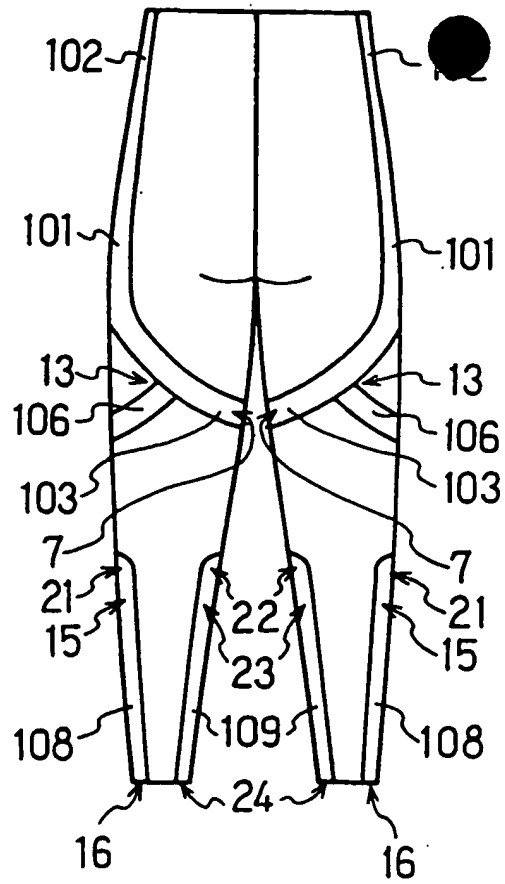


FIG. 24

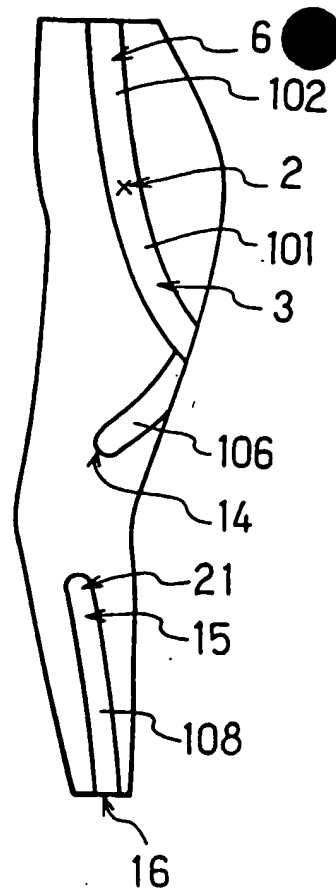


FIG. 25

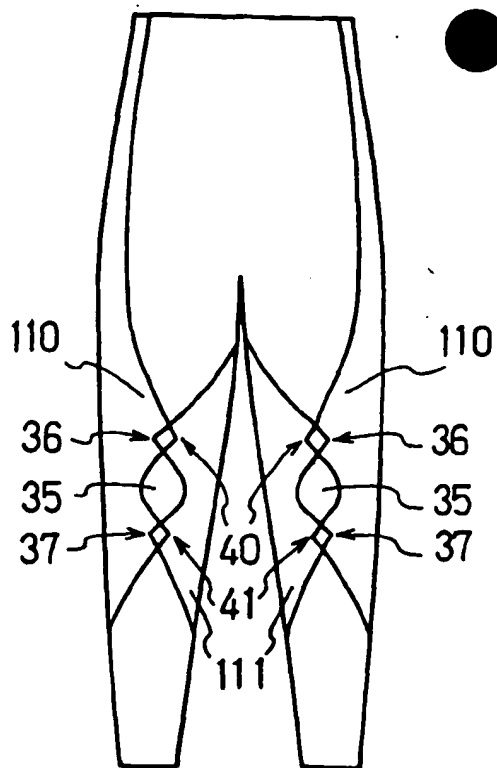


FIG. 26

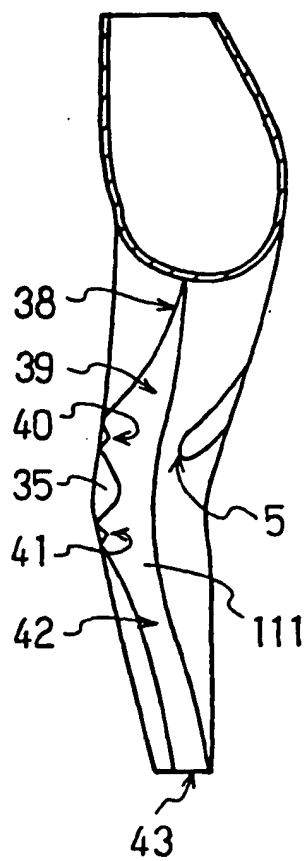


FIG. 27

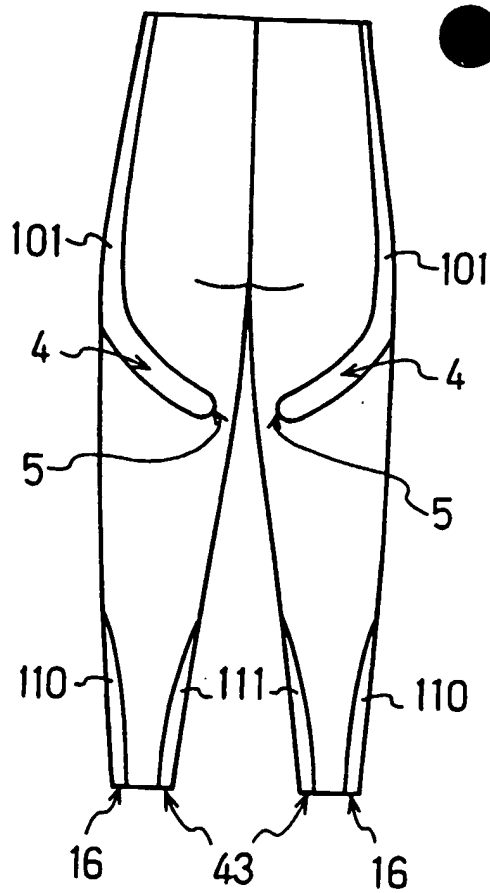


FIG. 28

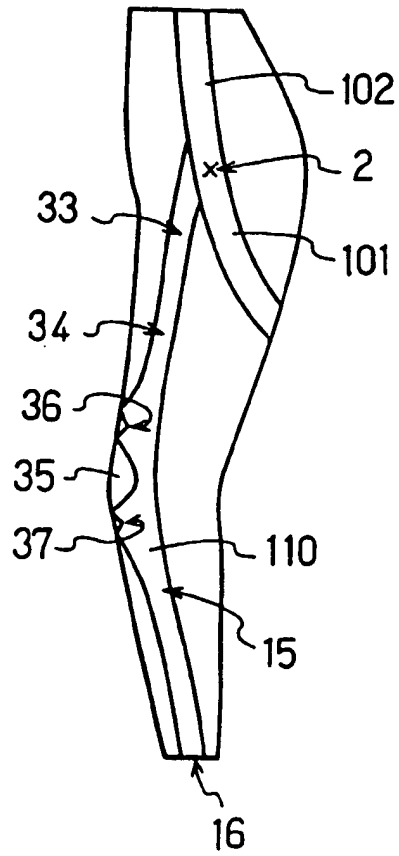


FIG. 29

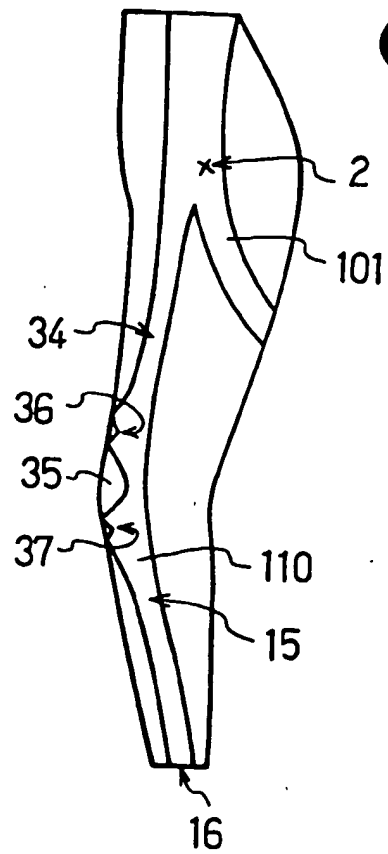


FIG. 30

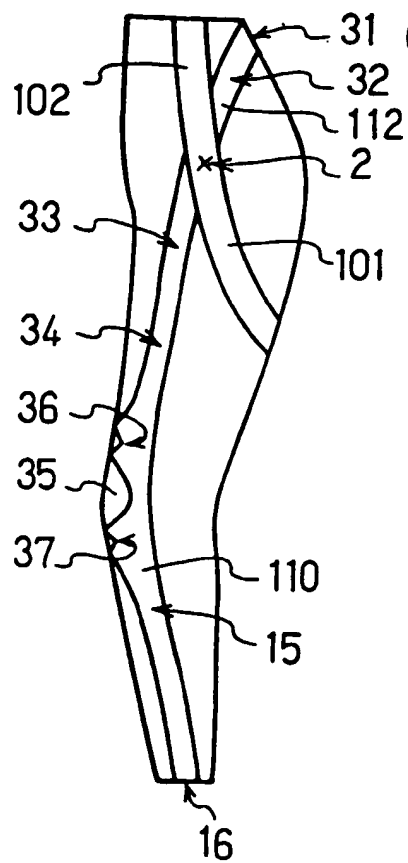


FIG. 31

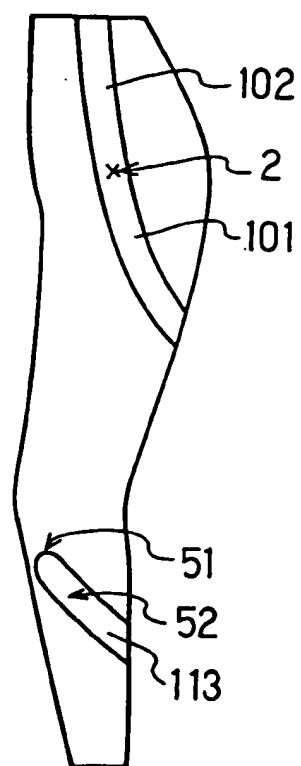


FIG. 32

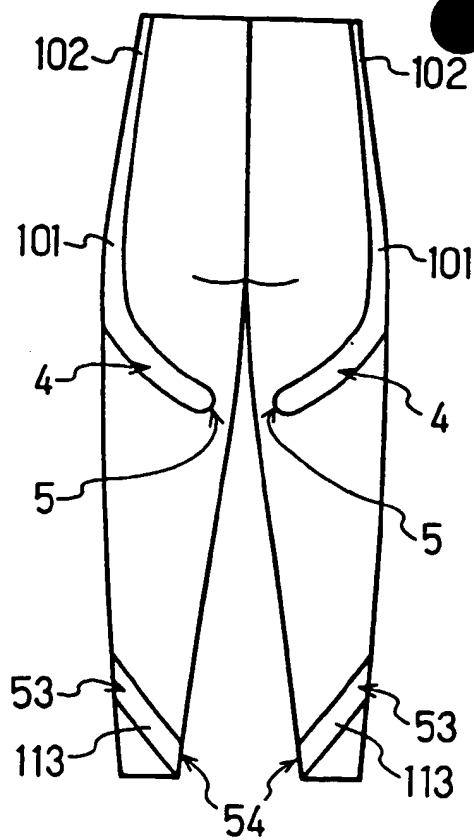


FIG. 33

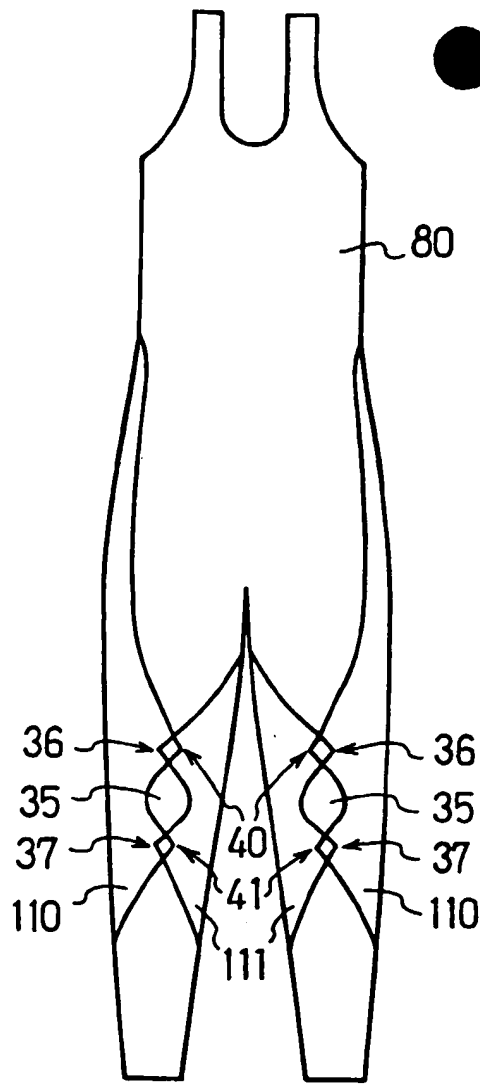


FIG. 34

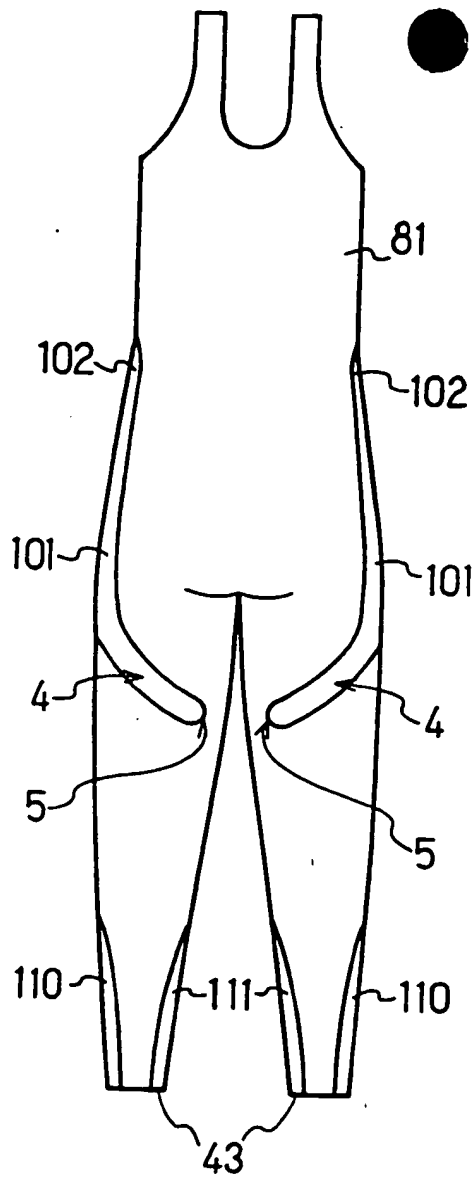


FIG. 35

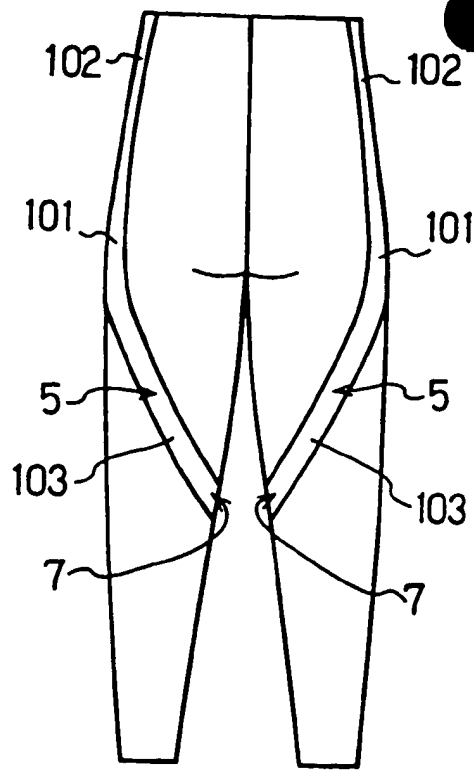


FIG. 36

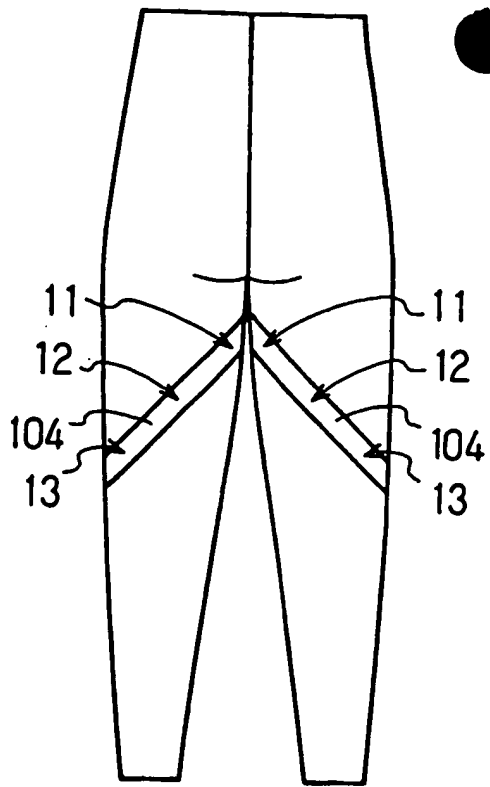


FIG. 37

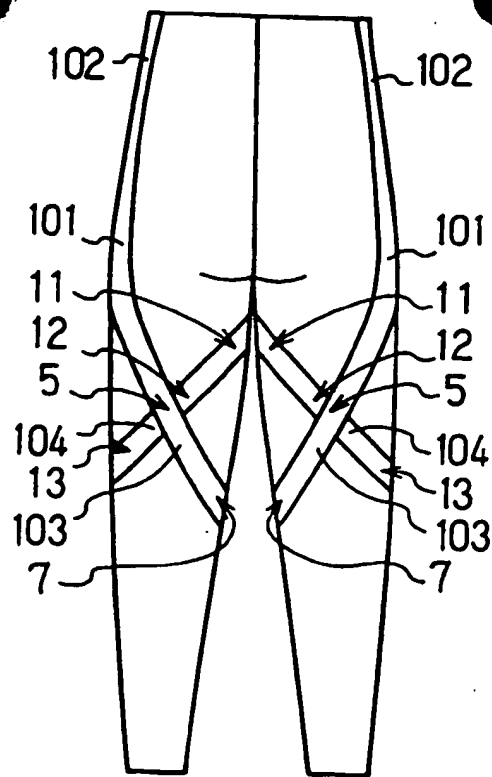


FIG. 38

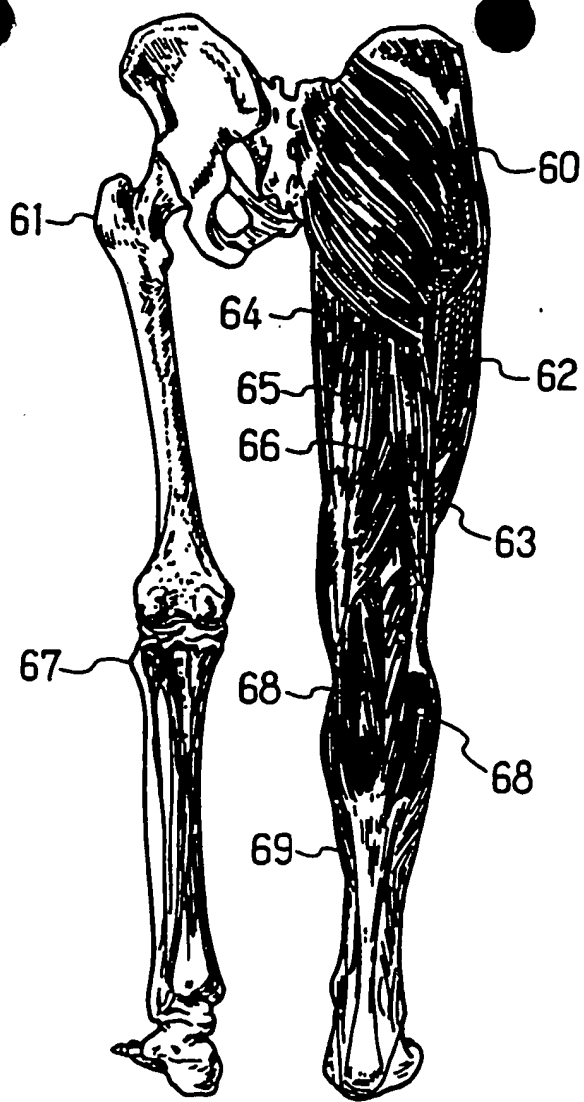


FIG. 39

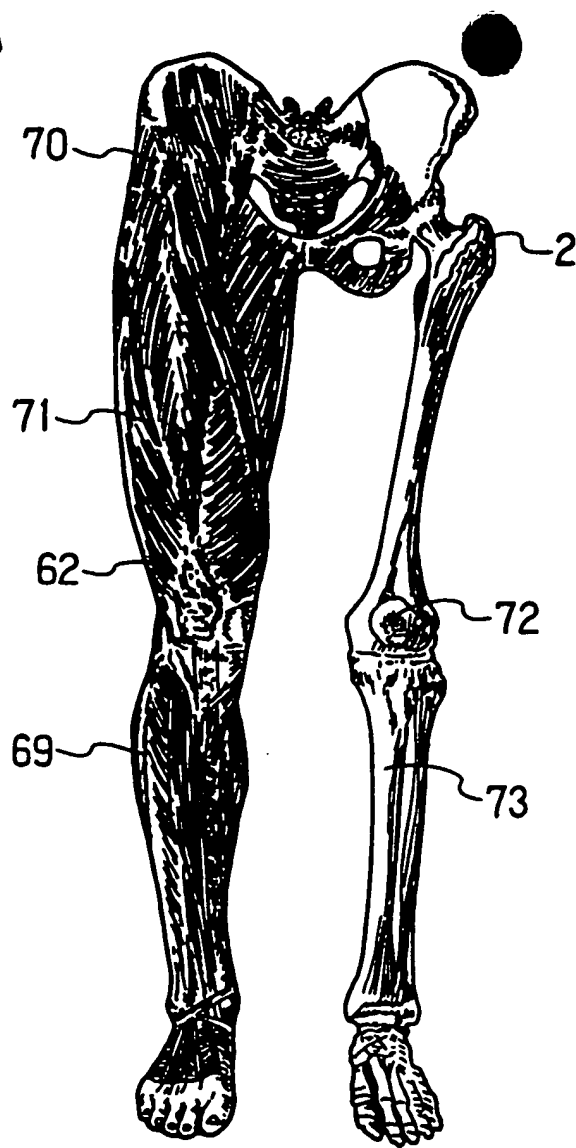


FIG. 40

INTERNATIONAL SEARCH REPORT

International application No.

CT/JP97/03372

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl⁶ A41B11/00, A41D13/00, A61F13/06, A63B71/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl⁶ A41B11/00, A41B11/14, A41D13/00, A61F13/06, A63B71/08, A41C1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1940 - 1996 Jitsuyo Shinan Toroku
Kokai Jitsuyo Shinan Koho 1971 - 1995 Koho 1996 - 1997
Toroku Jitsuyo Shinan Koho 1994 - 1997

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP, 519135, A (WACOAL CORP.), December 23, 1992 (23. 12. 92) & JP, 4-343868, A & US, 5263923, A & US, 5367708, A & DE, 69123245, E	1 - 24
A	JP, 4-50302, A (WACOAL CORP.), February 19, 1992 (19. 02. 92) (Family: none)	1 - 24
A	JP, 8-81807, A (Onyone K.K.), March 26, 1996 (26. 03. 96) (Family: none)	1 - 24
P	JP, 9-241906, A (Onyone K.K.), September 16, 1997 (16. 09. 97) (Family: none)	1 - 24



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"E" earlier document but published on or after the international filing date

"I" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

October 8, 1997 (08. 10. 97)

Date of mailing of the international search report

October 28, 1997 (28. 10. 97)

Name and mailing address of the ISA/

Japanese Patent Office

Facsimile No.

Authorized officer

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